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FOR REVIEW AND DISCUSSION
SUBJECT TO CHANGE

FY90 BASED COST MODELS TO SUPPORT DIAGNOSIS RELATED MANAGEMENT

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This document presents the development of updated cost models, using FY 1990 data, which support OASD(HA) direct care facility resource allocation efforts. The parametric forms of the models presented here are identical to the final models identified in an earlier report, Development of Cost Models to Support Diagnosis Related Management, (VRI-DMIS-2.60 WP91-1(R), Vector Research, Incorporated, 7 November 1991). Comparisons of FY 1990 predicted and observed costs are presented. The stability of the modeling methodology and resulting models is evaluated by comparing FY 1990 model projections to projections obtained using previously developed models.

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FOREWORD

This document presents the development of updated cost models, using FY90 data, which support OASD(HA) direct care facility resource allocation efforts. The parametric forms of the models presented here are identical to the final models identified in an earlier report, **Development of Cost Models to Support Diagnosis Related Management**, (VRI-DMIS-2.60 WP91-1(R), Vector Research, Incorporated, 7 November 1991). Comparisons of FY90 predicted and observed costs are presented. The stability of the modeling methodology and resulting models is evaluated by comparing FY90 model projections to projections obtained using previously developed models. This document was prepared under contract number MDA903-88-C-0147. Questions or comments regarding this document should be directed to LTC Stuart Baker, OASD(HA) Resource Analysis and Management Systems, (703) 756-1918.

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1.0 INTRODUCTION AND EXECUTIVE SUMMARY

This report presents updated DRG-based resource allocation models developed using FY90 MEPRS and Biometrics data, and compares the updated models to those developed using FY88 and FY89 data. The FY89 and FY90 models presented here were based upon the final model forms selected for use with the FY88 data. With the exception of identifying outlying facilities in the FY89 and FY90 data to exclude from the modeling, no further attempt was made to investigate alternative model specifications. **Development of Cost Models to Support Diagnosis Related Management**[1] discusses in detail the methodology and alternative model variables and specifications examined in the development of the FY88-based cost models. The remainder of this chapter briefly presents an overview of the steps involved in deriving the model parameter estimates and a short summary of the results. Chapter 2.0 presents a detailed discussion of the modeling methodology, the FY89 and FY90 parameter estimates, and compares the parameter estimates to those for FY88. Chapter 3.0 evaluates the FY90 models and presents a comparison of the FY88 and FY90 model projections for each military medical treatment facility (MTF), using FY90 workload and facility characteristics, to assess the stability of the estimated models.

The remainder of this chapter is organized as follows. Section 1.1 presents a brief overview of the modeling methodology and results. Section 1.2 presents summary comparisons of FY90 model projections to FY90 observed expenses. Section 1.3 presents a summary analysis of model stability. A final section discusses the potential impact of the Partnership Program upon model results.

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[1]VRI-DMIS-2.60 WP91-1(R), Vector Research, Incorporated, Ann Arbor, Michigan, 7 November 1991.

1.1 OVERVIEW OF FY90 MODELING METHODOLOGY AND RESULTS

Separate models were derived for each of the following expense categories:

- inpatient nonclinician expenses;
- inpatient clinician salaries; and
- ambulatory expenses.

The expense data for each MTF were obtained for each of these categories from the Medical Expense and Performance Reporting System (MEPRS). Furthermore, four separate peer groups were identified for analysis:

- medical centers;
- CONUS community hospitals;
- overseas hospitals; and
- stand-alone clinics.

The model specifications allowed for parameter estimates in each of the models to differ among Service branches. The basic workload measure for inpatient nonclinician and clinician modeling was the inpatient work unit (IWU). Medical center inpatient nonclinician models include an adjustment for indirect expenses incurred from operating a graduate medical education (GME) program. This adjustment corresponds to that performed by the Health Care Financing Administration (HCFA) for the Medicare prospective payment system (PPS). This adjustment is made for medical centers only.

Inpatient Nonclinician Expense Models

The final model specification adopted for medical centers was:

$$INPNONC\$ = (B_0 + B_1*IWU) * (1 + C_1*D\_NAVY) * (1 + C_2*D\_USAF) * (1 + C_3*GMEINT).$$

For CONUS community hospitals and overseas hospitals, the final model specification was:

$$INPNONC\$ = (B_0 + B_1*IWU) * (1 + C_1*D\_NAVY) * (1 + C_2*D\_USAF).$$

Where:

INPNONC$ = inpatient nonclinician expenses;

IWU = inpatient work units;

D_NAVY = 1 for Navy MTFs, and
0 otherwise;

D_USAF = 1 for Air Force MTFs, and
= 0 otherwise; and

GMEINT = the GME program intensity, computed as:

$$\frac{[10 * (\#\text{ of residents plus interns})]}{\frac{ADPL}{0.95}}.$$

ADPL is the observed average daily patient load or average daily census. B_0, B_1, C_1, and C_2 are parameters estimated by the regression. B_0 is the fixed cost associated with providing health care at an MTF of the given facility type. B_1 is the marginal cost of providing one IWU of health care. C_1 and C_2 are the percentage cost adjustments associated with providing a given level of IWUs in Navy and Air Force MTFs, relative to the Army. (The Army model is equivalent to the base model, with no Service branch adjustment.) Finally, C_3 is the percentage increase in total costs at medical centers with GME programs associated with each one-tenth of a resident per "bed," where facility bed capacity was estimated using the ADPL/.95. This estimate of bed capacity for medical centers was used since reliable bed counts were not available. Note that for all years, C_3 was constrained to equal 4%.

Inpatient Clinician Salary Models

The final parametric form for the inpatient clinician salary models was:

$$CLNSAL\$ = B_1*D\_ARMY*IWU + B_2*D\_NAVY*IWU + B_3*D\_USAF*IWU;$$

where CLNSAL$ equals inpatient clinician salaries. Here B_1 measures the marginal cost of providing one IWU of health care in Army facilities, in terms of inpatient clinician salaries. B_2 and B_3 provide similar estimates for Navy and Air Force MTFs, respectively. Note that the absence of an intercept term, or fixed cost parameter, implies that the marginal cost coefficients are equal to the average inpatient clinician expense per IWU for each Service.

Ambulatory Expense Models

The final model specification for ambulatory expenses was:

$$AMBEXP\$ = (B_0 + B_1*AWU) * (1 + C_1*D\_NAVY) * (1 + C_2*D\_USAF);$$

where:

AMBEXP$ = ambulatory expense;

AWU = ambulatory work units;

D_NAVY = 1 for Navy MTFs, and
0 otherwise; and

D_USAF = 1 for Air Force MTFs, and
0 otherwise.

The interpretation of coefficients corresponds to that provided above for inpatient nonclinician expenses, with the exception that no adjustment is made for GME program intensity.

Finally, a number of facilities were excluded from the FY90 models because preliminary models indicated that their costs were atypical when compared to other MTFs within their peer group. These facilities are presented in the table below.

MTFs Excluded from FY90 Modeling

Inpatient Facility Type	Inpatient Nonclinician	Clinician	Ambulatory
Medical Centers	Tripler AMC NH Bethesda	NH Bethesda	Walter Reed
CONUS Community Hospitals	Womack AH	NH Cherry Pt.	Womack AH NH Long Beach BRH NAVSTA Adak
Overseas Hospitals	2nd Gen. Hosp. -- Landstuhl NH Okinawa		NH Okinawa
Medical Clinics			NMCL Port Hueneme NMCL Pearl Harbor

The estimated FY88, FY89, FY90 Version 4, and FY90 Version 8 Army models are presented in exhibit 1-1. The Navy models are presented in exhibit 1-2, in reduced form after adjusting the intercept and marginal cost coefficients by the estimated Navy coefficient. The reduced form Air Force models are presented in exhibit 1-3.

One should be cautious in drawing conclusions about model stability from the large difference observed for any given parameter between two years' models. First, there has been no accounting for inflation in the parameters presented. Secondly, while any of these point estimates may appear to be quite different from one year or grouper version to another, the standard error involved in estimating them may be large enough that they may not be statistically different. Finally, note that often the intercept term and the marginal cost term change in different directions from one year or grouper version to another. Taken together, these changes serve to mitigate the change observed for one parameter alone. The entire models, rather than the individual coefficients, should be compared from year to year. These comparisons were conducted as part of the analysis and summary results are presented in the next section.

EXHIBIT 1-1: COMPARISON OF ARMY REDUCED FORM FY88, FY89, FY90 VERSION 4, AND FY90 VERSION 8 MEPRS COST MODEL PARAMETERS

	EXPENSE TYPE	VARIABLES	PARAMETER ESTIMATES				PERCENT CHANGES			
			FY88	FY89	FY90 Version 4	FY90 Version 8	FY88 TO FY89	FY88 TO FY90 Version 4	FY88 TO FY90 Version 8	FY90 Version 4 to FY90 Version 8
Medical Centers	INPATIENT NONCLINICIAN	INTERCEPT	-$3,313.113	$2,042.462	$6,867.340	$7,950.864	N/A	N/A	N/A	15.8%
		IWU	$2.026	$1.907	$1.659	$1.653	-5.9%	-18.2%	-18.4%	-0.3%
		GME INT	4.00%	4.00%	4.00%	4.00%				
	INPATIENT CLINICIAN	D_ARMY*IWU	$0.142	$0.165	$0.167	$0.170	16.0%	17.3%	19.1%	1.5%
	AMBULATORY	INTERCEPT	$10,315.465	$5,813.707	$8,340.005	$8,340.005	-43.6%	-19.2%	-19.2%	----
		AWU	$1.541	$2.021	$1.983	$1.983	31.1%	28.6%	28.6%	----
CONUS Comm Hospitals	INPATIENT NONCLINICIAN	INTERCEPT	$659.239	$720.745	$752.073	$830.668	9.3%	14.1%	26.0%	10.5%
		IWU	$1.748	$1.897	$1.905	$1.920	8.5%	9.0%	9.8%	0.8%
	INPATIENT CLINICIAN	D_ARMY*IWU	$0.103	$0.110	$0.108	$0.110	6.6%	5.3%	6.7%	1.3%
	AMBULATORY	INTERCEPT	$857.382	$1,192.155	$1,145.694	$1,145.694	39.0%	33.6%	33.6%	----
		AWU	$1.707	$1.876	$2.039	$2.039	9.9%	19.5%	19.5%	----
Overseas Hospitals	INPATIENT NONCLINICIAN	INTERCEPT	$492.192	$619.876	$477.441	$511.118	25.9%	-3.0%	3.8%	7.1%
		IWU	$1.948	$2.114	$2.383	$2.402	8.5%	22.3%	23.3%	0.8%
	INPATIENT CLINICIAN	D_ARMY*IWU	$0.146	$0.149	$0.158	$0.160	1.9%	8.0%	9.6%	1.4%
	AMBULATORY	INTERCEPT	$1,883.923	$1,310.260	$1,422.539	$1,422.539	-30.5%	-24.5%	-24.5%	----
		AWU	$1.951	$2.229	$2.442	$2.442	14.2%	25.1%	25.1%	----
Clinics	AMBULATORY	INTERCEPT	$1,667.443	$856.110	$912.860	$912.860	-48.7%	-45.3%	-45.3%	----
		AWU	$1.758	$2.345	$2.624	$2.624	33.4%	49.3%	49.3%	----

Note: Dollars stated in thousands

EXHIBIT 1-2: COMPARISON OF NAVY REDUCED FORM FY88, FY89, FY90 VERSION 4, AND FY90 VERSION 8 MEPRS COST MODEL PARAMETERS

	EXPENSE TYPE	VARIABLES	PARAMETER ESTIMATES				PERCENT CHANGES			
			FY88	FY89	FY90 Version 4	FY90 Version 8	FY88 TO FY89	FY88 TO FY90 Version 4	FY88 TO FY90 Version 8	FY90 Version 4 to FY90 Version 8
Medical Centers	INPATIENT NONCLINICIAN	INTERCEPT	-$3,273.282	$2,125.717	$7,576.640	$8,256.241	N/A	N/A	N/A	9.0%
		IWU	$2.002	$1.985	$1.830	$1.717	-0.9%	-8.6%	-14.3%	-6.2%
		GME INT	4.00%	4.00%	4.00%	4.00%				
	INPATIENT CLINICIAN	D_ARMY*IWU	$0.193	$0.191	$0.172	$0.164	-0.9%	-10.8%	-15.3%	-5.0%
	AMBULATORY	INTERCEPT	$13,108.872	$6,713.215	$10,720.051	$10,720.051	-48.8%	-18.2%	-18.2%	---
		AWU	$1.959	$2.334	$2.548	$2.548	19.2%	30.1%	30.1%	---
CONUS Comm Hospitals	INPATIENT NONCLINICIAN	INTERCEPT	$854.537	$895.760	$1,011.221	$1,050.640	4.8%	18.3%	22.9%	3.9%
		IWU	$2.266	$2.358	$2.561	$2.429	4.0%	13.0%	7.2%	-5.2%
	INPATIENT CLINICIAN	D_ARMY*IWU	$0.160	$0.155	$0.156	$0.148	-3.1%	-2.3%	-7.2%	-5.1%
	AMBULATORY	INTERCEPT	$1,172.137	$1,512.417	$1,426.679	$1,426.679	29.0%	21.7%	21.7%	---
		AWU	$2.333	$2.380	$2.540	$2.540	2.0%	8.8%	8.8%	---
Overseas Hospitals	INPATIENT NONCLINICIAN	INTERCEPT	$562.861	$674.722	$482.084	$492.380	19.9%	-14.4%	-12.5%	2.1%
		IWU	$2.228	$2.302	$2.406	$2.314	3.3%	8.0%	3.9%	-3.8%
	INPATIENT CLINICIAN	D_ARMY*IWU	$0.157	$0.135	$0.152	$0.146	-14.3%	-3.8%	-7.3%	-3.9%
	AMBULATORY	INTERCEPT	$2,143.878	$1,505.979	$1,378.740	$1,378.740	-29.8%	-35.7%	-35.7%	---
		AWU	$2.220	$2.562	$2.367	$2.367	15.4%	6.6%	6.6%	---
Clinics	AMBULATORY	INTERCEPT	$1,728.244	$866.029	$945.764	$945.764	-49.9%	-45.3%	-45.3%	---
		AWU	$1.822	$2.372	$2.719	$2.719	30.2%	49.2%	49.2%	---

Note: Dollars stated in thousands

EXHIBIT 1-3: COMPARISON OF AIR FORCE REDUCED FORM FY88, FY89, FY90 VERSION 4, AND FY90 VERSION 8 MEPRS COST MODEL PARAMETERS

	EXPENSE TYPE	VARIABLES	PARAMETER ESTIMATES				PERCENT CHANGES			
			FY88	FY89	FY90 Version 4	FY90 Version 8	FY88 to FY89	FY88 to FY90 Version 4	FY88 to FY90 Version 8	FY90 Version 4 TO FY90 Verson8
Medical Centers	INPATIENT NONCLINICIAN	INTERCEPT	-$3,634.985	$2,235.527	$7,506.216	$8,511.257	N/A	N/A	N/A	13.4%
		IWU	$2.223	$2.087	$1.813	$1.770	-6.1%	-18.5%	-20.4%	-2.4%
		GME INT	4.00%	4.00%	4.00%	4.00%				
	INPATIENT CLINICIAN	D_ARMY*IWU	$0.149	$0.150	$0.134	$0.135	1.0%	-9.6%	-9.0%	0.7%
	AMBULATORY	INTERCEPT	$9,386.021	$6,107.287	$8,912.379	$8,912.379	-34.9%	-5.0%	-5.0%	----
		AWU	$1.402	$2.123	$2.119	$2.119	51.4%	51.1%	51.1%	----
CONUS Comm Hospitals	INPATIENT NONCLINICIAN	INTERCEPT	$674.585	$729.635	$814.853	$891.182	8.2%	20.8%	32.1%	9.4%
		IWU	$1.789	$1.920	$2.064	$2.060	7.4%	15.4%	15.2%	-0.2%
	INPATIENT CLINICIAN	D_ARMY*IWU	$0.095	$0.099	$0.108	$0.110	3.7%	13.3%	15.3%	1.7%
	AMBULATORY	INTERCEPT	$949.770	$1,236.582	$1,182.404	$1,182.404	30.2%	24.5%	24.5%	----
		AWU	$1.890	$1.946	$2.105	$2.105	2.9%	11.3%	11.3%	----
Overseas Hospitals	INPATIENT NONCLINICIAN	INTERCEPT	$446.371	$517.819	$421.804	$441.230	16.0%	-5.5%	-1.2%	4.6%
		IWU	$1.767	$1.766	$2.105	$2.074	0.0%	19.2%	17.4%	-1.5%
	INPATIENT CLINICIAN	D_ARMY*IWU	$0.092	$0.102	$0.097	$0.089	10.4%	4.8%	-3.8%	-9.9%
	AMBULATORY	INTERCEPT	$1,524.045	$1,037.786	$1,185.337	$1,185.337	-31.9%	-22.2%	-22.2%	----
		AWU	$1.578	$1.765	$2.035	$2.035	11.8%	28.9%	28.9%	----
Clinics	AMBULATORY	INTERCEPT	$1,188.256	$702.100	$729.482	$729.482	-40.9%	-38.6%	-38.6%	----
		AWU	$1.253	$1.923	$2.097	$2.097	53.5%	67.4%	67.4%	----

Note: Dollars stated in thousands

EXHIBIT 1-4: SUMMARY COUNTS OF HOSPITALS WITH FY90 MODEL PREDICTED TOTAL EXPENSES NOT WITHIN 25% OF ACTUAL FY90 TOTAL EXPENSES

	ARMY		NAVY		USAF		ALL SERVICES	
	FY88	FY90	FY88	FY90	FY88	FY90	FY88	FY90
MEDICAL CENTER EXPENSE MODELS								
NONCLINICIAN EXPENSES	1	0	1	1	0	0	2	1
CLINICIAN EXPENSES	2	2	2	1	2	1	6	4
AMBULATORY EXPENSES	0	0	0	0	0	0	0	0
TOTAL EXPENSES*	0	0	0	0	0	0	0	0
FACILITIES ESTIMATED**	8	8	4	4	6	6	18	18
CONUS COMMUNITY HOSPITAL MODELS								
NONCLINICIAN EXPENSES	5	5	4	3	8	9	17	17
CLINICIAN EXPENSES	12	9	9	10	18	18	39	37
AMBULATORY EXPENSES	2	1	4	6	6	5	12	12
TOTAL EXPENSES*	1	1	3	4	5	5	9	10
FACILITIES ESTIMATED**	29	29	21	21	59	59	109	109
OVERSEAS HOSPITAL MODELS								
NONCLINICIAN EXPENSES	2	3	2	2	2	2	6	7
CLINICIAN EXPENSES	0	1	6	6	5	6	11	13
AMBULATORY EXPENSES	0	0	5	2	5	3	10	5
TOTAL EXPENSES*	0	0	2	2	4	3	6	5
FACILITIES ESTIMATED**	11	11	9	9	14***	14***	34	34
SUM OVER ALL HOSPITAL MODELS								
NONCLINICIAN EXPENSES	8	8	7	6	10	11	25	25
CLINICIAN EXPENSES	14	12	17	17	25	25	56	54
AMBULATORY EXPENSES	2	1	9	8	11	8	22	17
TOTAL EXPENSES*	1	1	5	6	9	8	15	15
FACILITIES ESTIMATED**	48	48	34	34	79	79	161	161

*The Modeled to Observed Expense Ratio for Total Expenses is the ratio of the sum of the modeled expenses for each model component (nonclinician, clinician, and ambulatory expenses) to the sum of the observed expenses within each component.

**This is the number of facilities for which modeled and observed expenses were compared.

***The number of Air Force overseas hospitals for which modeled and observed expenses were compared was 13 for inpatient expenses, 14 for outpatient expenses, due to the fact that inpatient Biometrics data for USAF Hospital Iraklion were not available, precluding computation of inpatient workload.

1.2 MODEL ACCURACY

The FY88 (Version 4) and FY90 (Version 8) models were applied to FY90 Version 4 and FY90 Version 8 workload, respectively, to examine and compare the predictive performance of the models. A chart displaying the number of facilities whose projected FY90 expenses using either model differed from observed FY90 expenses by more than 25% is presented in exhibit 1-4.[1] The exhibit illustrates counts of facilities for which the predicted FY90 expenses were either less than 75% of actual FY90 expenses or greater than 125% of actual FY90 expenses. Separate counts are provided for each of the projection models examined. In addition, a comparison of total estimated inpatient and outpatient expenses (computed by summing the estimates from each model for each facility) to total observed expenses is presented. Thus, if separate models underestimated inpatient expenses and overestimated ambulatory expenses, the result may be an accurate estimate of total expenses. Note, since clinician salaries are a small component of total expenses (generally about five percent), the fact that these expenses are not accurately estimated has little influence on the accuracy of the estimate of total expenses. It can be seen from exhibit 1-4 that only 15 of 161 hospitals in FY90 had a difference of greater than 25% between observed total expenses and those projected by either the FY90 Version 8 models or the FY88 models. Of the 15 noted for each year's model, the 14 that are common to both are displayed in the following table:

---

[1]The error bound 25% is used as a simple mechanism to identify outliers; it is straightforward to interpret and is not meant to imply statiscal significance.

Hospitals with FY88 and FY90 Model Predictions Different from FY90 observed Expenses by More than 25%

DMIS ID	Facility
4	Air University Rgn Hospital -- Maxwell AFB
7	BRH NAVSTA Adak
17	93rd Strategic Hospital -- Castle AFB
30	BRH MGAGCC Twenty-nine Palms
36	USAF Hospital Dover
89	Womack AH -- Ft. Bragg
96	USAF Hospital Tinker
127	NH Oak Harbor
129	90th Strategic Hospital -- F.E. Warren AFB
621	NH Okinawa
623	NH Keflavik
630	USAF Hospital Torrejon
632	USAF Hospital Upper Heyford
635	USAF Hospital Incirlik

Of these 14, three were excluded from either the inpatient nonclinician or ambulatory FY90 modeling for having a cost/workload relationship very different from other facilities: BRH NAVSTA Adak, Womack AH, and NH Okinawa.

The following table summarizes the comparison of clinic model FY90 predictions to actual FY90 expenses.

Clinics with > 25% Difference Between Modeled and Actual FY90 Expenses

	Army		Navy		USAF		Total	
	FY88 Model	FY90 Model	FY88 Model	FY90 Model	FY88 Model	FY90 Model	FY88 Model	FY90 Model
# of Clinics with > 25% Difference	0	0	5	5	6	4	11	9
Facilities Estimated	2	2	9	9	40	40	51	51

As with hospitals, PRIMUS/NAVCARE and occupational health workcenter expenses and workload were excluded from the modeling, because these activities will not be included in the DRG-based resource allocation. The

table identifies 11 clinics having observed FY90 expenses more than 25% different from those predicted by the FY88 model, and 9 that have observed FY90 expenses more than 25% different from those predicted by the FY90 model. There were 8 clinics common to both sets. These clinics are listed in the following table:

Clinics with FY88 and FY90 Model Predictions Different from FY90 Expenses by More than 25%

DMISID	Facility
26	NMCL Port Hueneme
280	NMCL Pearl Harbor
321	NMCL Portsmouth
338	USAF Clinic Vance
396	NMCL Seattle
799	USAF Clinic Geilenkirchen
815	USAF Clinic Fairford
8931	NMCL London

Of the clinics noted for having greater than a 25% difference between predicted and actual FY90 expenses, NMCL Port Hueneme and NMCL Pearl Harbor were excluded from the FY90 parameter estimation because their FY90 cost/workload relationships were substantially different from the other facilities and inclusion would have had an adverse effect on the statistical accuracy of the model.

An alternative view of the differences between projected and observed expenses is presented in exhibit 1-5. The histogram displays the number of facilities having projected total expenses differing from observed total expenses by a given percentage range. As with the previous exhibit, total expenses for each MTF refers to the sum of expenses across all expense categories for the given MTF. It can be seen from exhibit 1-5 that 119 of 212 of all facilities (56%), and 95 of 161 hospitals (59%) in FY90 had a difference between modeled and observed total expenses within ten percent. A similar histogram is presented in

EXHIBIT 1-5: HISTOGRAM OF PERCENTAGE DIFFERENCES BETWEEN FY90 OBSERVED TOTAL EXPENSES AND FY90 VERSION 8 MODEL PREDICTED EXPENSES: ALL FACILITIES

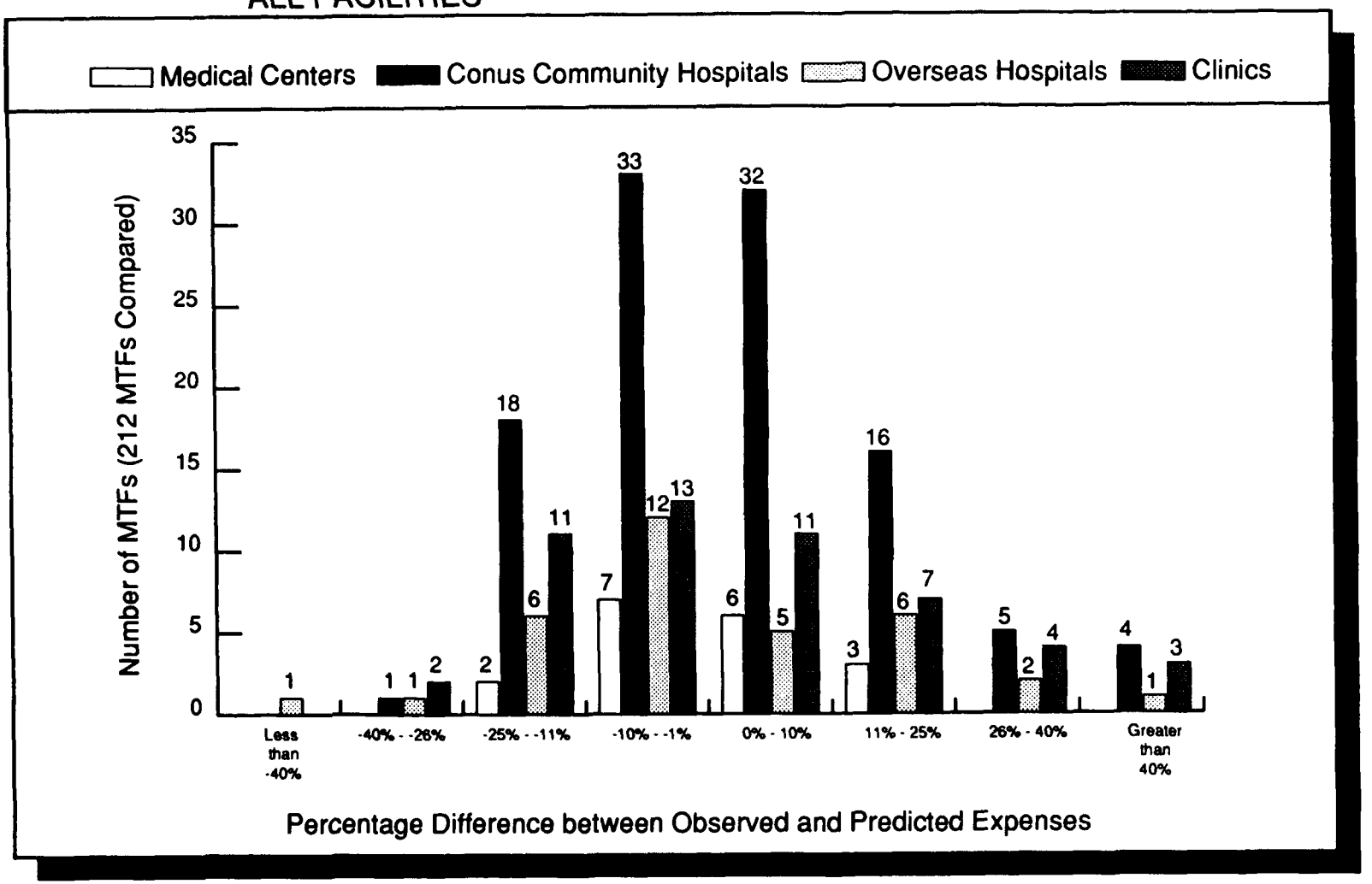


exhibit 1-6 for Army MTFs, illustrating that 34 out 50 Army MTFs (68%) had differences between observed and projected FY90 expenses of ten percent or less. The Navy histogram in exhibit 1-7 reveals that 19 of 43 Navy MTFs (44%) had differences between projected and actual expenses within ten percent. Only 1 out of 9 Navy clinics was in this range. Ignoring clinics, the percentage of Navy MTFs with a ten percent or less difference between projected and actual expenses rises to 53% (18 out of 34 MTFs). Navy clinics did not lend themselves to modeling as well as other Navy facilities or clinics of the other Services. The histogram in exhibit 1-8 demonstrates that 68 out of 119 Air Force facilities (57%) had projected budgets within ten percent of observed FY90 expenses.

1.3 STABILITY ANALYSIS

The importance of stability lies in the issue of whether models developed using a given year's data are useful in allocating budgets for subsequent years and grouper versions. If the budget projections provided by the FY88 and FY90 Version 8 models are generally similar, then the models are stable between the two years, and there is no reason that one year's model cannot be used to project expenses for subsequent years.

In terms of assessing stability, the necessity of focusing on the differences in model projections rather than on the differences between FY88 model projections of FY90 expenses and observed FY90 expenses was demonstrated earlier in exhibits 1-4 though 1-8. Even models based upon FY90 expenses and Version 8 workload resulted in FY90 projections that were more than 25% different from observed FY90 expenses. The critical test is whether a model based upon earlier years' data would yield substantially different projections than a model based in the projection

EXHIBIT 1-6: HISTOGRAM OF PERCENTAGE DIFFERENCES BETWEEN FY90 OBSERVED TOTAL EXPENSES AND FY90 VERSION 8 MODEL PREDICTED EXPENSES: ARMY FACILITIES

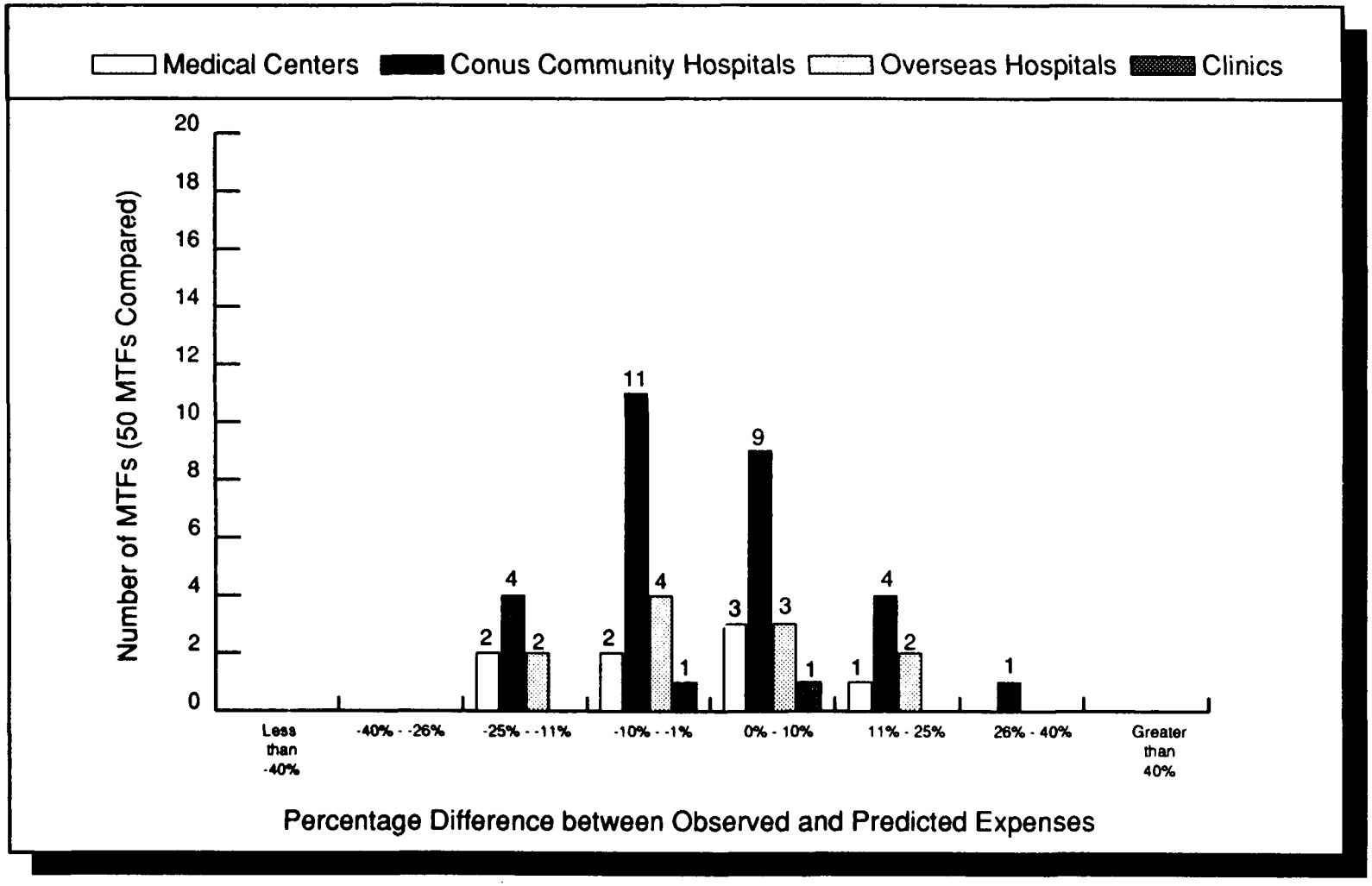


EXHIBIT 1-7: HISTOGRAM OF PERCENTAGE DIFFERENCES BETWEEN FY90 OBSERVED TOTAL EXPENSES AND FY90 VERSION 8 MODEL PREDICTED EXPENSES: NAVY FACILITIES

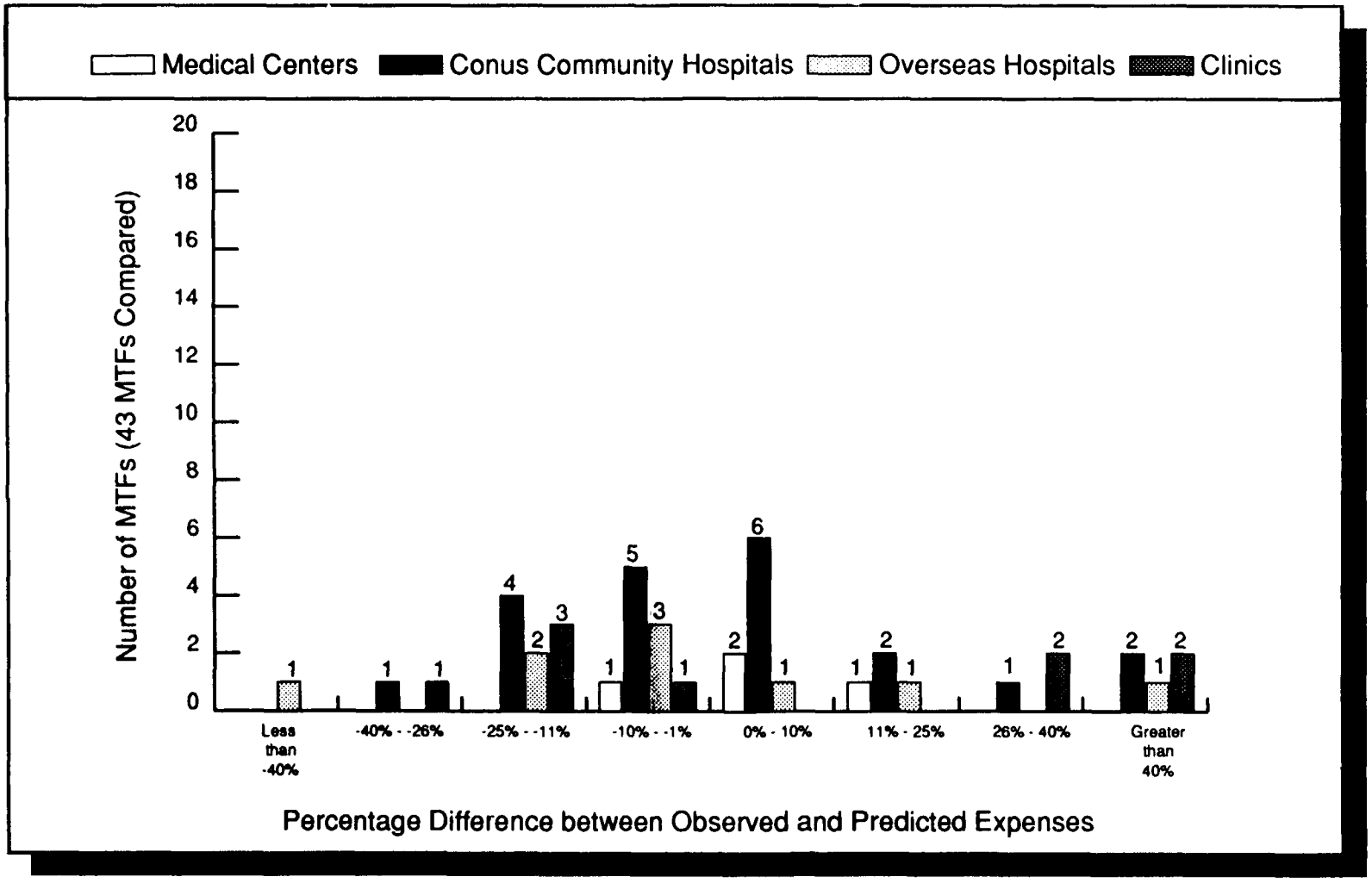
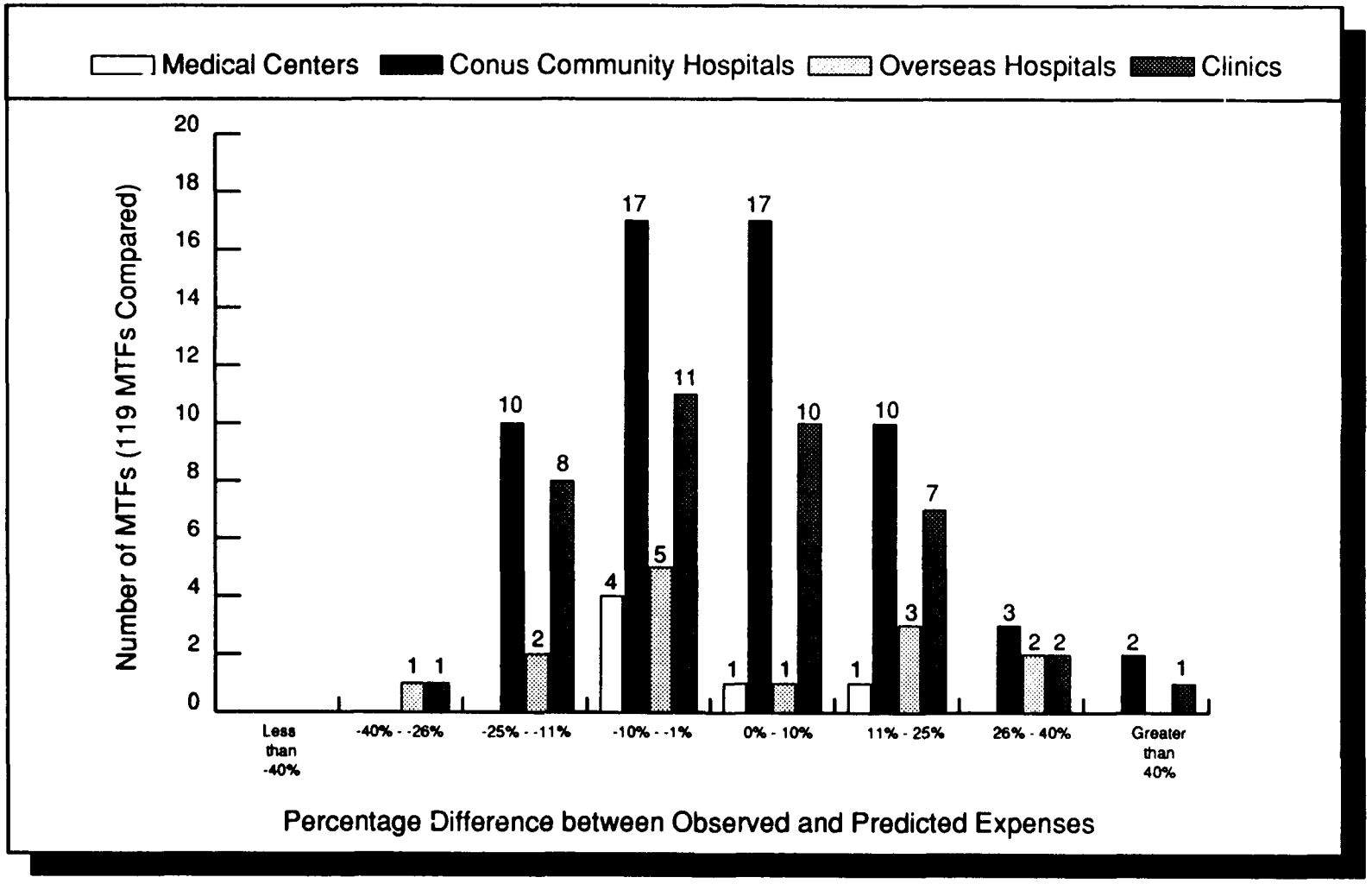


EXHIBIT 1-8: HISTOGRAM OF PERCENTAGE DIFFERENCES BETWEEN FY90 OBSERVED TOTAL EXPENSES AND FY90 VERSION 8 MODEL PREDICTED EXPENSES: AIR FORCE FACILITIES



year itself. Put another way, the goal of the analysis was to determine whether the alternate model projections would produce different sets of facilities which, had projected expenses varying excessively from observed expenses.

One view of stability was presented in the previous section, identifying the facilities having both FY88 and FY90 model predicted total expenses different from observed FY90 total expenses. To an overwhelming extent, the facilities that were identified as having actual FY90 expenses considerably different from one year's model projections were also the facilities identified as having FY90 expenses considerably different from the other year's model projections. Therefore, at an aggregate level of expense, the models appeared to be very stable.

At a more detailed level, the procedure for assessing inpatient model stability was to compare MTF projected budgets using the FY88 models to those projected using FY90 Version 8 models, with FY90 workload as the independent variable for both models. For the FY88 models, Version 4 workload was input. The FY90 Version 8 projections were performed using Version 8 workload. The FY88 projections were then adjusted by an estimated rate of inflation to allow comparisons. Finally, the differences between the projections for each MTF were examined in order to determine how many facilities had profound differences between the level of expenses projected by each model. The results of this procedure are summarized in exhibit 1-9. This exhibit presents counts of facilities for which the FY90 expenses predicted by the FY90 (Version 8) model were either less than 90% of those predicted by the FY88 model or greater than 110% of those predicted by the FY88 model[1]. Separate

[1]The error bound of 10% is used as a simple mechanism to identify outliers; it is straightforward to interpret and is not meant to imply statistical significance.

EXHIBIT 1-9: SUMMARY COUNTS OF HOSPITALS WITH FY90 MODEL PREDICTED TOTAL EXPENSES NOT WITHIN 10% OF FY88 MODEL PREDICTED TOTAL EXPENSES

	ARMY	NAVY	USAF	ALL SERVICES
MEDICAL CENTER EXPENSE MODELS				
NONCLINICIAN EXPENSES	2	1	4	7
CLINICIAN EXPENSES	6	4	6	16
AMBULATORY EXPENSES	0	2	4	6
TOTAL EXPENSES*	1	0	2	3
FACILITIES ESTIMATED**	8	4	6	18
CONUS COMMUNITY HOSPITAL MODELS				
NONCLINICIAN EXPENSES	1	4	7	8
CLINICIAN EXPENSES	0	10	14	2
AMBULATORY EXPENSES	0	0	0	0
TOTAL EXPENSES*	0	0	0	0
FACILITIES ESTIMATED**	29	21	59	109
OVERSEAS HOSPITAL MODELS				
NONCLINICIAN EXPENSES	5	0	3	8
CLINICIAN EXPENSES	0	1	1	2
AMBULATORY EXPENSES	0	9	4	13
TOTAL EXPENSES*	0	5	1	6
FACILITIES ESTIMATED**	11	9	14***	34
SUM OVER ALL HOSPITAL MODELS				
NONCLINICIAN EXPENSES	8	5	14	27
CLINICIAN EXPENSES	6	15	21	42
AMBULATORY EXPENSES	0	11	8	19
TOTAL EXPENSES*	1	5	3	9
FACILITIES ESTIMATED**	48	34	79	161

*The Modeled to Observed Expense Ratio for Total Expenses is the ratio of the sum of the modeled expenses for each model component (nonclinician, clinician, and ambulatory expenses) to the sum of the observed expenses within each component.

**This is the number of facilities for which modeled and observed expenses were compared.

***The number of Air Force overseas hospitals for which modeled and observed expenses were compared was 13 for inpatient expenses, 14 for outpatient expenses, due to the fact that inpatient Biometrics data for USAF Hospital Iraklion were not available, precluding computation of inpatient workload.

counts are provided for each of the expense categories examined, and for total expenses predicted for each facility.

It can be seen from exhibit 1-9 that, in general, the predictions for total expenses were closer than for any individual expense category. This finding suggests that the model projections are more stable when considered in the aggregate than for the individual expense components. Only 9 facilities out of 161 had total expenses predicted by the models which differed from each other by more than 10 percent. Of these nine MTFs, there were no CONUS community hospitals, 3 were medical centers, and 6 were overseas hospitals. This finding indicates that the CONUS community hospital models may be relatively more stable than the medical center or overseas hospital expenses.

The following table summarizes the comparison of clinic model FY90 predictions to clinic model FY88 predictions.

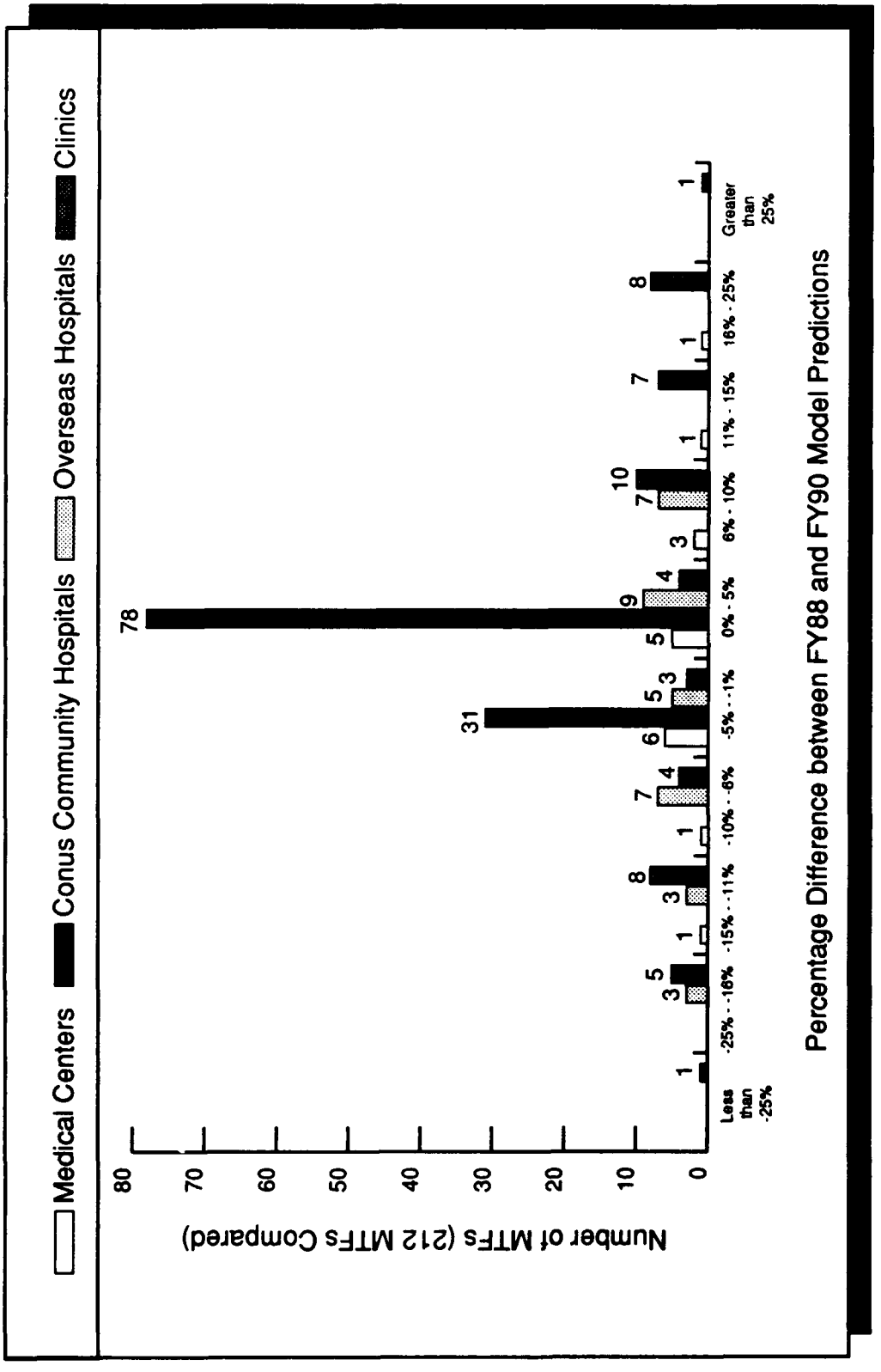
Clinics with > 10% Difference Between FY90 Expenses Predicted by FY90 and FY88 Models

	Army	Navy	USAF	Total
# of Clinics with > 10% Difference	2	5	23	30
Facilities Estimated	2	9	40	51

This illustration revcals that clinic models may be slightly less stable than the hospital models, when considering how closely the models replicate each other's predictions.

An alternative view of the differences between model projections is presented in exhibit 1-10. The histogram displays the number of facilities having FY90 model projections of FY90 expenses differing from FY88 models projections of FY90 expenses by a given percentage range. As with the previous exhibit, total expenses for each MTF refers to the sum of expenses across all expense categories for the given MTF. It can

EXHIBIT 1-10: HISTOGRAM OF PERCENTAGE DIFFERENCES BETWEEN FY90 BUDGETS PREDICTED BY FY88 AND FY90 MODELS: ALL FACILITIES



be seen from exhibit 1-10 that 141 of 212 facilities (67%) in FY90 had a difference between the alternative model projections of less than five percent. While this is a fairly high percentage, it is even higher when considering inpatient facilities alone; for hospitals, the figure was 134 out of 161 MTFs (83%). Within inpatient facilities, all CONUS community hospital FY90 model projections, representing 109 facilities, differed from FY88 model projections by five percent or less. For medical centers, 11 of 18 MTF FY90 model projections (61%) were within five percent of the FY88 projections, while 15 (83%) were within ten percent. For overseas hospitals, 14 of 34 MTF FY90 model projections (41%) differed from FY88 model projections by five percent or less, and 28 (82%) differed by ten percent or less. Finally, only 7 of 51 clinic FY90 model projections (14%) were within five percent of the FY88 projections, with 21 clinics (41%) differing by ten percent or less. These figures suggest a fairly high degree of stability in the medical center and hospital models (particularly CONUS community hospitals), with a lower degree of stability present in the clinic models.

A similar histogram is presented in exhibit 1-11 for Army facilities only. For the Army, 41 out of 50 MTFs (82%) had FY90 model projections varying from FY88 model projections by five percent or less, and 47 (94%) were within ten percent. All Army CONUS community hospitals are in the 0% - 5% range. The Navy histogram, displayed in exhibit 1-12, reveals that 26 out of 43 Navy MTFs (60%) had FY90 model projections differing from FY88 model projections by less than five percent, while 33 (77%) differed by ten percent or less. Of the remaining ten facilities, all are either overseas hospitals or clinics, suggesting that these facilities produce somewhat less stable models than the CONUS community hospitals or medical centers. Finally, the histogram presenting comparisons of FY90 model projections to FY88 model

EXHIBIT 1-11: HISTOGRAM OF PERCENTAGE DIFFERENCES BETWEEN FY90 BUDGETS PREDICTED BY FY88 AND FY90 MODELS: ARMY FACILITIES

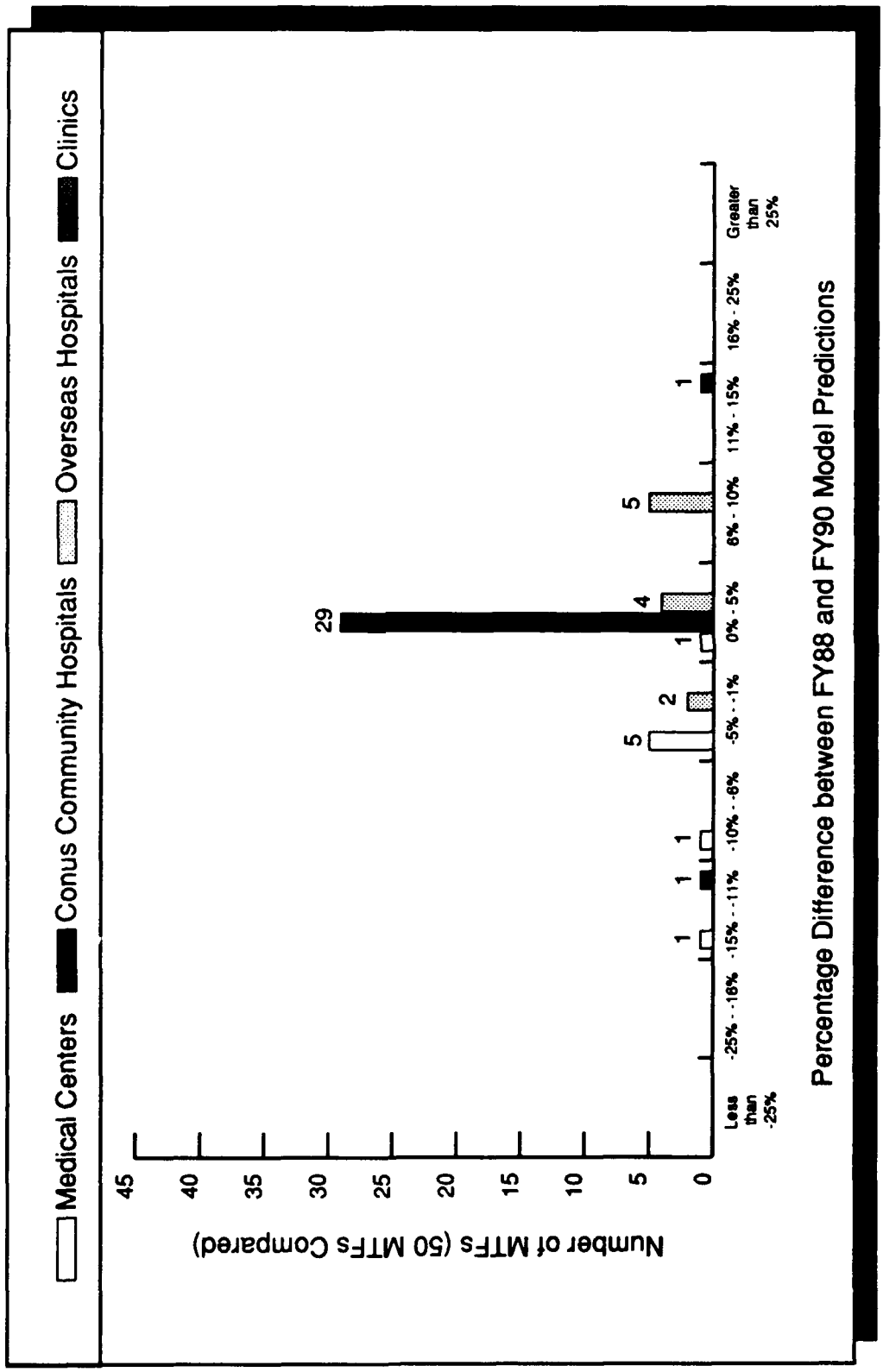
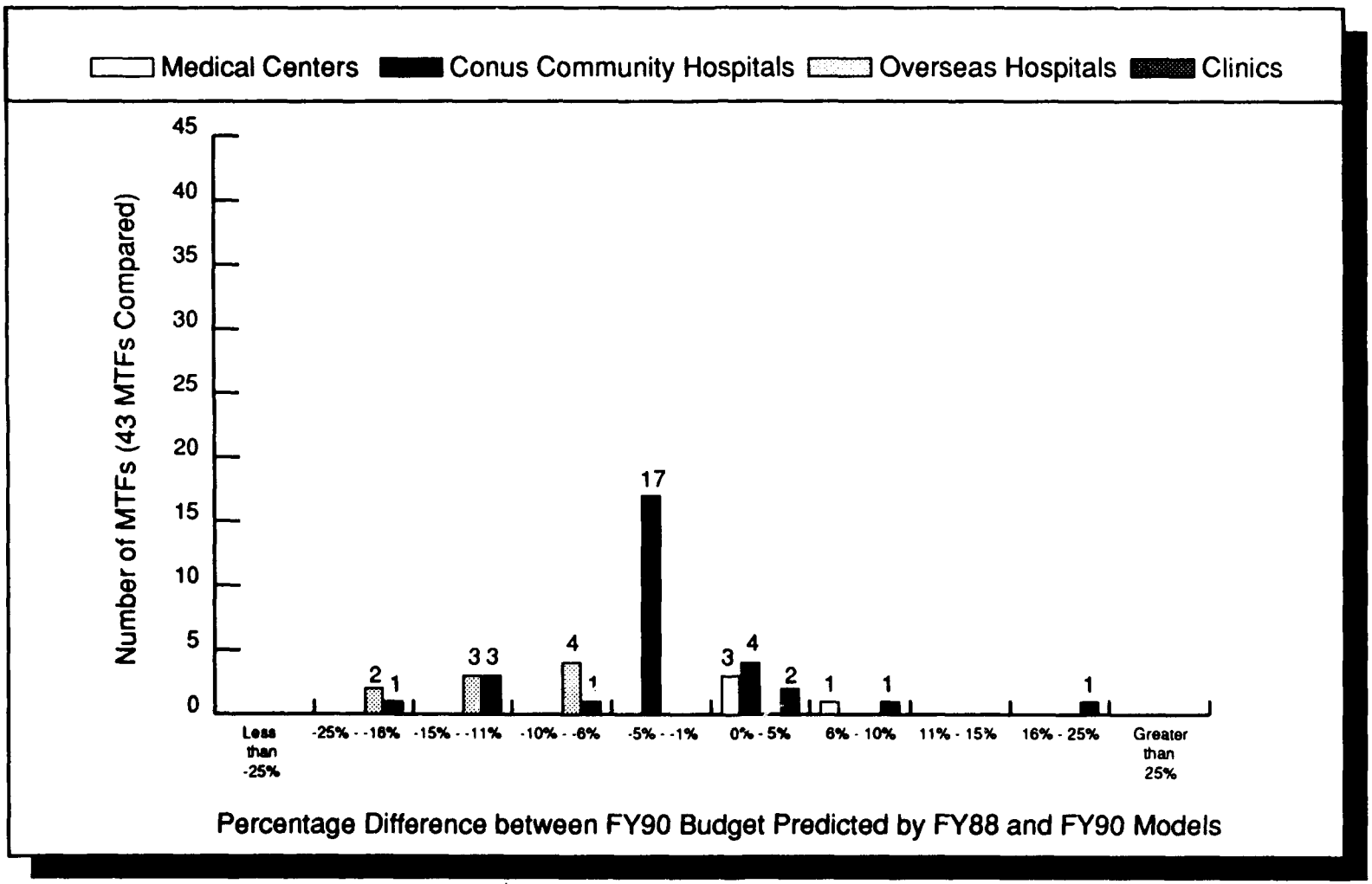


EXHIBIT 1-12: HISTOGRAM OF PERCENTAGE DIFFERENCES BETWEEN FY90 BUDGETS PREDICTED BY FY88 AND FY90 MODELS: NAVY FACILITIES



projections for Air Force facilities is presented in exhibit 1-13. Of the 119 Air Force facilities compared, 75 MTFs (62%) have model projections within five percent of their FY90 expenses as projected by the FY88 models. For 93 MTFs (78%) these projections are within ten percent of each other.

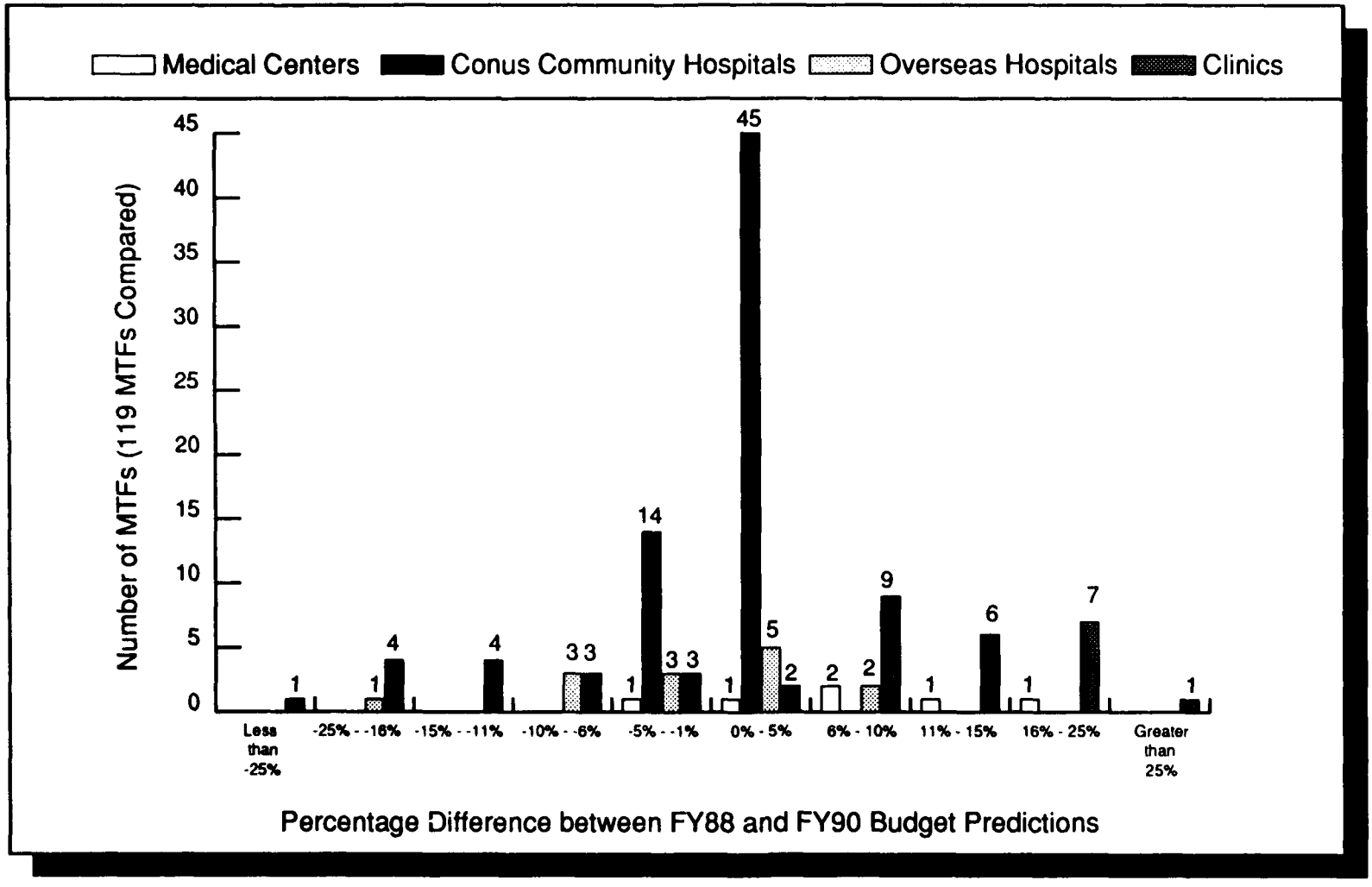
1.4 THE EFFECT OF THE PARTNERSHIP PROGRAM

Under the Partnership Program a MTF may contract with a civilian physician to provide care at the MTF. These relationships have an impact on the level of direct care resources required to provide health care; there would be less MTF resources required to provide care for any given disposition or visit to a Partnership physician at an MTF. If one facility were providing a certain proportion of its care through Partnership, it would have less expenses than a facility providing similar levels of care, all with MTF physicians. Because different facilities have different degrees of Partnership participation, the effect upon parameter estimation is difficult to quantify.

A further complicating factor is the manner in which Partnership data are recorded in the MEPRS data. Partnership workload and expenses are reported in MEPRS at the fourth character Standard Account Code level by the MTF. However, MEPRS data are made available at the third character Standard Account Code level, a lower degree of detail, making it difficult to ascertain the level of workload and expense attributable to Partnership cases. Even if four-character MEPRS data were obtained, they are recorded inconsistently from one MTF to another, making assessment of the exact level of workload and costs attributable to Partnership very difficult.

Because the direct impact of Partnership upon direct care workloads and expenses was not measured, the method for assessing

EXHIBIT 1-13: HISTOGRAM OF PERCENTAGE DIFFERENCES BETWEEN FY90 BUDGETS PREDICTED BY FY88 AND FY90 MODELS: AIR FORCE FACILITIES



Partnership influence was to examine CHAMPUS data to determine which catchment areas had high levels of Partnership participation. Then the modeling results for these facilities were analyzed in order to evaluate whether high levels of Partnership participation were correlated with model projections that overestimated actual expenses.

Partnership costs and workload are reported at the catchment area level, which includes all Partnership Program participation for patients residing in an MTF's catchment area independent of the MTF at which the patient obtained services. Thus, the catchment area costs and workload serve only as a surrogate measure of MTF Partnership Program participation. Note, however, that over 80% of FY90 Partnership expenses were for outpatient services and most beneficiaries that receive outpatient care at an MTF will do so within the catchment area where they reside.

Total expense and workload provided under the Partnership Program were obtained for each MTF catchment area from CHAMPUS Health Care Summary data. Two facilities had catchment area total inpatient partnership expenses greater than 10% of facility total inpatient MEPRS expenses:

DMIS ID	Facility	Partnership Share
3	Lyster AH -- Ft. Rucker	17.3%
119	USAF Hospital Hill	11.4%

Eleven facilities had catchment area outpatient partnership expenses greater than ten percent of facility total inpatient MEPRS expenses:

DMIS ID	Facility	Partnership Share
3	Lyster AH -- Ft. Rucker	28.4%
115	67th Medical Group -- Bergstrom AFB	19.5%
16	USAF Hospital Mather	14.2%
4	Air University Rgn Hosp -- Maxwell AFB	13.9%
119	USAF Hospital Hill	12.7%
8	Bliss AH -- Ft. Huachuca	12.5%
110	Darnall AH -- Ft. Hood	12.5%
32	Evans AH -- Ft. Carson	11.7%
21	22nd Strategic Hospital -- March AFB	11.5%
83	USAF Hospital Kirtland	11.0%
36	USAF Hospital Dover	10.5%

PRIMUS/NAVCARE and Occupational Health clinic costs were excluded from MTF ambulatory costs in computing the Partnership share.

As noted above, one should expect facilities with a great deal of Partnership to have estimated expenses greater than observed, as workload is expected to be reported through MEPRS but not all costs. If the partnership arrangement is such that work is done at the MTF, and ancillary expenses are covered through the MTF's budget, clinician salaries may be the only missing component. Additionally, some MTFs may report the clinician FTEs, which would be converted to MEPRS costs, and the impact may be difficult to detect given the estimating error of the models.

The results of comparing projected budgets with actual expenses for the facilities identified above were inconclusive. The inpatient nonclinician expense projections for USAF Hospital Hill were 18% greater than actual expenses, but the projections for Lyster AH -- Ft. Rucker were just 3% greater. The ambulatory expense projections for the Lyster AH -- Ft. Rucker, 67th Medical Group -- Bergstrom AFB, USAF Hospital Mather, Evans AH -- Ft. Carson, 22nd Strategic Hospital -- March AFB, and USAF Hospital Kirtland were all less than observed expenses, with 67th Medical Group -- Bergstrom AFB and USAF Hospital Mather by more than ten percent. Bliss AH -- Ft. Huachuca and Darnall AH -- Ft. Hood had ambulatory expense projections greater than observed expenses, but

by less than ten percent. Estimated ambulatory expenses at Air University Regional Hospital -- Maxwell AFB were $5.5. million greater than observed (72% greater), yet total outpatient Partnership expenses within the catchment area were only $571,773. Likewise, at USAF Hospital Dover, estimated ambulatory expenses were roughly $2.2 million higher than actual expenses (37% greater), yet total outpatient Partnership expenses were only $614,567 within the catchment area. Finally, projected expenses were $1.1 million greater (14%) than observed, while the outpatient Partnership expenses total only $565,664. It is likely that Partnership only accounts for a small portion of the modeling error observed for these facilities.

Overall, it was determined that many facilities are funding a substantial portion of outpatient care through the Partnership Program, but the impact is not causing systematic MEPRS modeling error. The impact may not be detected due to differences in reporting methods or Partnership workload, expenses, and FTEs within MEPRS, or different types of Partnership arrangements, rather than model imprecision. Furthermore, the Partnership Program has been growing rapidly, and may be of concern at some facilities in the future. Overall, however, the current impact does not appear systematic and most likely is small.

2.0 MODELS AND RESULTS

The modeling process analyzed three categories of hospital expenses: inpatient nonclinician, inpatient clinician, and ambulatory expenses. The models were estimated using expense and workload data computed from MEPRS and Biometrics data. Section 2.1 presents the method for computing expenses, section 2.2 provides the methodology for computing workload, and section 2.3 presents the modeling results.

2.1 COMPUTING EXPENSES

Inpatient clinician salaries are separately identified in the MEPRS inpatient ("A") accounts. These expenses are reported as "clinician salaries" and include salaries for physicians, interns, and residents. Salary expenses are "for those clinicians whose services are normally provided in the civilian sector by clinicians not employed by the hospital and who bill the patient directly".[1] For each facility, these expenses were summed across all MEPRS inpatient workcenters to provide total inpatient clinician salaries for each MTF.

Inpatient nonclinician expenses were computed for each MTF by summing total expenses (including stepped-down ancillary and support expenses) across MEPRS inpatient workcenters, and subtracting the inpatient clinician salaries computed above.

Ambulatory expenses were computed for each MTF by summing total expenses (including stepped-down ancillary and support expenses) across MEPRS ambulatory workcenters ("B") accounts. Expenses within the Occupational Health and PRIMUS/NAVCARE workcenters were not included as they

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[1] Medical Expense and Performance Reporting System for Fixed Military Medical and Dental Treatment Facilities, DoD 6010.13-M, ASD(HA), page A-9, January 1991.

receive funding under program elements currently not included in the DRG-based resource allocation system.

2.2 COMPUTING WORKLOAD

This section describes the methodology for computing inpatient and ambulatory workload measures. Section 2.2.1 discusses inpatient workload measures and section 2.2.2 presents the methodology applied to compute ambulatory workload measures.

2.2.1 COMPUTING INPATIENT WORKLOAD

Workload for FY88 and FY89 was based upon the HCFA FY87 (Version 4) Grouper, and FY90 workload data were computed using both the Version 4 Grouper and the CHAMPUS FY91 (Version 8) Grouper.

HCFA DRG case weights, with minor modifications, were applied in combination with the annual direct care outlier criteria to compute Version 4 workload for FY88, FY89, and FY90. The Version 8 DRG weights and outlier criteria represent CHAMPUS criteria, and were used to compute Version 8 workload for FY90.

The workload measure used to model inpatient expenses was the inpatient work unit (IWU). Exhibit 2-1 presents the steps involved in computing IWUs from data grouped using the Version 8 grouper. The amount of credit given to a particular patient stay was computed from a base weight associated with the DRG assigned to the given episode, combined with adjustments for unusually long or short lengths of stay. The sum of the weighted dispositions and adjustments is referred to as Relative Weighted Products (RWPs), and the Case-Mix Index (CMI) is the average number of RWPs per disposition. The CMI is then divided by an adjustment factor to form the Relative Case-Mix Index (RCMI). The

EXHIBIT 2-1: FY90 VERSION 8 IWU CALCULATION METHODOLOGY

1. Version of DRG Grouper: 8.0

2. DRG Base Weights
- Taken primarily from CHAMPUS as published in the 5 November 1990 Federal Register and based upon CHAMPUS hospital claims for the period 1 July 1989 through 30 June 1990. HCFA FY91 weights, multiplied by a factor of 1.1607, were used for DRGs where CHAMPUS weights were not calculated.

3. Geometric Mean Length of Stay (GLOS) and Trim Point Calculation Methodology
- Taken from CHAMPUS as published in the 5 November 1990 Federal Register except DRGs 103 (Heart Transplant) and 480 (Liver Transplant), which were taken from HCFA (low trim point set to 1 since HCFA does not set low trim points).
- CHAMPUS trim points are based on the GLOS plus or minus the lesser of 3 standard deviations of the LOS or 29 days.

4. Per Diem Weights
- defined as the DRG base weight divided by the GLOS.

5. Relative Weighted Product (RWP) Calculation

Direct admissions and births not transferred out, and all transfer in cases:
- inliers: credited with base DRG weight;
- short-stay outliers: 200 percent of the per diem weight for each day, with the total not to exceed the base weight; and
- long-stay outliers: base weight plus 60 percent of the per diem weight for each day beyond the upper trim point.

Direct admissions and births that are transferred out:
- inliers and short-stay outliers: per diem weights for each day but with a total not to exceed the base DRG weight; and
- long-stay outliers: base weight plus 60 percent per diem (as above).

Exceptions:
- DRGs 469 (invalid Dx) and 470 (not groupable):
  - no RWP credit
- DRGs 385, 600, 601, 603, 605, 608 (neonate, died or transferred) and 456 (burns transferred to another acute facility):
  - short-stay outliers treated as inliers.

6. Case-Mix Index (CMI) Calculation
- CMI = RWPs / (Biometrics Dispositions excluding DRGs 469 and 470)

7. Relative Case-Mix Index (RCMI) Calculation
- RCMI = CMI / (0.8109 * CMI Correction Factor)

8. Inpatient Work Units (IWUs) Calculation
- IWUs = RCMI * MEPRS Dispositions

adjustment factor allows the DoD average case complexity of all dispositions to be equal to the average FY85 DoD disposition.

A decrease in the overall CMI was observed after updating from the Version 4 Grouper and direct care cutpoints to the Version 8 DRG Grouper and CHAMPUS outlier criteria. Thus, it was necessary to adjust Version 8 CMIs to preserve comparability of IWUs over time. The ratio of the FY90 Version 8 to Version 4 CMI was 0.9895, indicating that the average complexity of each disposition using the Version 8 Grouper was approximately 1.05% lower. This difference is solely attributable to the fact that the grouper assignment software, case weights, and outlier criteria were updated.[1] The formula for computing IWUs is:

$$\text{IWUs} = \frac{\text{CMI}}{(.8109 * \text{CMI Correction Factor})} * \text{MEPRS Dispositions.}$$

The Version 4 to Version 8 CMI correction factor is equal to 0.9895 and therefore IWUs for version 8 CMI are computed as:

$$\text{IWUs} = \frac{\text{CMI}}{0.8024} * \text{MEPRS Dispositions.}$$

Thus, the correction factor compensates for the fact that there was a 1.05% decrease in CMI strictly due to updating the grouper, associated weights, and outlier criteria. There is no need to apply a correction factor for CMIs based on Version 4 software, weights, and outlier criteria.

The FY90 GME data were obtained from the Office of the Assistant Secretary of Defense for Health Affairs (OASD(HA)) for Professional Affairs and Quality Assurance (PA&QA). Exhibit 2-2 displays the changes

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[1]Further details concerning the development of AWU weights are provided in **FY90 Based Ambulatory Work Unit (AWU) Weight Development**, VRI-DMIS-2.60 WP92-8, Vector Research, Incorporated, Ann Arbor, Michigan, 20 May 1992.

EXHIBIT 2-2: CHANGES IN (E COUNTS AND INTENSITY FOR MEDICAL CENTERS, FY88 - FY90

DMIS ID	FACILITY NAME	INSTALLATION NAME	FY88 GME	FY90 GME	GME Difference	GME % Difference	FY88 GME Intensity	FY90 GME Intensity	Intensity Difference	Intensity % Difference
0014	DAVID GRANT USAF MED CTR	TRAVIS AFB	98	104	6	6%	4.5868	4.9055	0.3186	7%
0022	LETTERMAN AMC	PRESIDIO OF S. F.	181	20	-161	-89%	6.3597	0.7866	-5.5731	-88%
0027	NH OAKLAND	OAKLAND	122	147	25	20%	6.3613	9.3000	2.9386	46%
0029	NH SAN DIEGO	SAN DIEGO	285	339	54	19%	7.7786	8.1960	0.4173	5%
0031	FITZSIMONS AMC	DENVER	155	197	42	27%	4.2158	5.0067	0.7908	19%
0037	WALTER REED AMC	WASHINGTON	371	524	153	41%	5.3719	7.3868	2.0149	38%
0047	EISENHOWER AMC	FT. GORDON	109	120	11	10%	3.4003	3.9451	0.5448	16%
0052	TRIPLER AMC	FT. SHAFTER	173	198	25	14%	4.0234	4.7514	0.7280	18%
0055	USAF MED CTR SCOTT	SCOTT AFB	21	25	4	19%	1.5251	2.2482	0.7231	47%
0066	MALCOM GROW USAF MED CTR	ANDREWS AFB	23	37	14	61%	1.0325	1.8054	0.7729	75%
0067	NH BETHESDA	BETHESDA	208	256	48	23%	5.7349	8.5446	2.8097	49%
0073	USAF MED CTR KEESLER	KEESLER AFB	86	88	2	2%	3.5031	3.5673	0.0642	2%
0095	USAF MED CTR WRIGHT-PATTERSON	WRIGHT-PATTERSON AFB	93	109	16	17%	5.2942	5.4353	0.1412	3%
0108	WILLIAM BEAUMONT AMC	FT. BLISS	124	137	13	10%	3.4965	4.2323	0.7358	21%
0109	BROOKE AMC	FT. SAM HOUSTON	225	273	48	21%	5.1144	7.2463	2.1319	42%
0117	WILFORD HALL USAF MED CTR	LACKLAND AFB	301	375	74	25%	4.3251	5.7169	1.3918	32%
0124	NH PORTSMOUTH	PORTSMOUTH	192	196	4	2%	4.9215	5.7404	0.8189	17%
0125	MADIGAN AMC	FT. LEWIS	169	201	32	19%	5.3753	7.1193	1.7440	32%

in GME counts and intensity for medical centers between FY88 and FY90. GME intensity, or concentration, is defined as the number of tenths of a resident per "bed," where facility bed size was estimated by ADPL/.95. The construction of the GME adjustment in the medical center inpatient nonclinician expense model was designed to correspond to that employed in the Medicare and CHAMPUS programs. These systems reimburse the indirect costs of GME by paying a given percentage of inpatient nonprofessional costs multiplied by the number of tenths of a resident per hospital bed. "Active" bed size of MTFs was estimated using ADPL because reliable data on MTF bed size corresponding to civilian definitions were not available. When assessing model stability across years, the FY90 GME values are used for both FY88 and FY90 projections.

2.2.2 COMPUTING AMBULATORY WORKLOAD

The ambulatory work unit (AWU) was used to measure ambulatory workload for each MTF. It was computed by multiplying the number of visits within each workcenter by an AWU weight assigned to each workcenter, and then summing over all workcenters for each MTF. The AWU weight is based previous years' ambulatory cost and visit data and is defined as:

$$\text{AWU weight} = \frac{\text{Average Ambulatory Cost per Visit in MEPRS third-level Workcenter}}{\text{DoD average Inpatient Cost per IWU}};$$

where ambulatory costs include direct and stepped-down support and ancillary expenses.[1] Inpatient costs include total direct, support, and ancillary expense, including clinician salaries reported within MEPRS inpatient accounts. PRIMUS/NAVCARE and Occupational Health expenses and

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[1] Further details concerning the development of AWU weights are provided in **FY90 Based Ambulatory Work Unit (AWU) Weight Development**, VRI-DMIS-2.60 WP92-8, Vector Research, Incorporated, Ann Arbor, Michigan, 20 May 1992.

workload were excluded from AWU computation and ambulatory modeling because these workcenters are funded through program elements not included in the DRG-based resource allocation system. Note that the AWU weight is computed such that the average expected resources required to complete one AWU of workload is equal to that required to complete one IWU of workload.

While a CMI correction factor was necessary to state Version 8 inpatient workload in terms of IWUs, no such correction factor is necessary for AWUs. Therefore, while different Version 4 and Version 8 inpatient models were estimated for FY90, estimation of only one set of FY90 ambulatory models was required.

2.3 MODELING RESULTS

The modeling effort addressed three categories of hospital expenses: inpatient nonclinician, inpatient clinician, and ambulatory expenses. Models were developed based upon FY90 MEPRS and Biometrics data for medical centers, CONUS community hospitals, overseas hospitals, and MEPRs data for clinics. Note that the FY88 and FY89 medical center and clinic data were modified as follows, reflecting MEPRS data reporting changes that occurred in FY90:

- Brooke AMC was changed from an Air Force entity to an Army entity, reflecting the deactivation of the HQ San Antonio Joint Military Medical Command (JMMC) on 1 October 1991.
- NH Bethesda includes workload and expenses for NMCL Washington DC; NH Portsmouth includes workload and expenses for NMCL Norfolk; NH San Diego includes workload and expenses for NMCL San Diego; and NH Oakland includes workload and expenses for NMCL San Francisco. These clinics were therefore excluded from the clinic models.

These revisions were performed and the FY88 and FY89 medical center and clinic models were reestimated to provide results that were comparable to FY90 model results in order to assess model stability across years.

Note that FY88 results for medical center and clinic models will differ from those previously published. Finally, note that four facilities were missing from either the FY90 MEPRS or Biometrics data:

- USAH Berlin, 196th Station Hospital Shape - Belgium, and Wiesbaden AB did not report FY90 MEPRS data; and
- Iraklion AS did not report FY90 Biometrics data.

As a result, none of these facilities were included in the inpatient modeling, and only Iraklion AS was included in the ambulatory modeling.

The remainder of this section is comprised of four subsections. Section 2.3.1 presents a discussion of the inpatient nonclinician expense modeling, section 2.3.2 discusses the inpatient clinician salary modeling, section 2.3.3 discusses the ambulatory expenses modeling, and section 2.3.4 presents the estimated parameter coefficients.

2.3.1 INPATIENT NONCLINICIAN EXPENSES

The final model specification adopted for FY90 Version 4 and FY90 Version 8 medical center nonclinician expenses was:

$$INPNONC\$ = (B_0 + B_1*IWU) * (1 + C_1*D\_NAVY) * (1 + C_2*D\_USAF) * (1 + C_3*GMEINT).$$

For CONUS community hospitals and overseas hospitals, the final model specification was:

$$INPNONC\$ = (B_0 + B_1*IWU) * (1 + C_1*D\_NAVY) * (1 + C_2*D\_USAF).$$

Where:

INPNONC$ = inpatient nonclinician expenses;

IWU = inpatient work units;

D_NAVY = 1 for Navy MTFs, and
0 otherwise;

D_USAF = 1 for Air Force MTFs, and
0 otherwise; and

GMEINT = the graduate medical education (GME) program intensity, computed as:
(10 * (# of residents plus interns))/
((average daily patient load (ADPL))/.95).

B_0, B_1, C_1, and C_2 are parameters estimated by the regression. B_0 is the fixed cost associated with providing health care in an MTF of the given facility type. B_1 is the marginal cost of providing one IWU of health care. C_1 and C_2 are the percentage cost adjustments associated with providing a given level of IWUs in Navy and Air Force MTFs, relative to the Army. (The Army model is equivalent to the base model, with no Service branch adjustments.) Finally, C_3 is the percentage increase in total costs associated with each one-tenth of a resident per "bed." Using FY88 DoD direct care data, C_3 was estimated at 4.03%, which was very close to the Medicare estimate of 4.05%. Therefore, this estimate was rounded to 4.0%, and constrained versions of the medical center models were then estimated. In the course of the FY90 modeling, this parameter was reestimated. While the parameter estimate was lower than that for FY88 (2.69%), it was not statistically significantly different. For this reason, for the sake of consistency, and for the fact that the HCFA estimate is based upon thousands of observations, rather than just over 100, C_3 was constrained to 4.0% for the FY90 medical center inpatient nonclinician expense models, as well as those for FY88 and FY89.

For the FY90 models, NH Bethesda and Tripler Army Medical Center (AMC) were excluded from the medical center inpatient nonclinician modeling; and NH Bethesda was excluded for FY89. These facilities were excluded because their costs were atypical when compared to the remaining medical centers and maintaining them in the regression estimation would have caused the models to be nonrepresentative. For similar reasons, Womack Army Hospital (AH) was eliminated from the final FY90 CONUS

community hospital inpatient nonclinician models, and NH Okinawa and 2nd General Hospital - Landstuhl were eliminated from the FY90 overseas hospital models.

2.3.2 INPATIENT CLINICIAN SALARIES

The final parametric form for FY90 inpatient clinician salary model was

$$CLNSAL\$ = B_1*D\_ARMY*IWU + B_2*D\_NAVY*IWU + B_3*D\_USAF*IWU;$$

where CLNSAL$ equals inpatient clinician salaries. Here B_1 measures the marginal cost of providing one IWU of health care in Army Facilities, in terms of inpatient clinician salaries. B_2 and B_3 provide similar estimates for Navy and Air Force MTFs, respectively. Note that the absence of an intercept term implies that the marginal cost coefficients are equal to the average inpatient clinician expense per IWU for each Service. NH Bethesda was eliminated from the modeled medical centers for all four models. As noted above for inpatient nonclinician expenses, this facility was atypical in its level of expenses, relative to IWUs. NH Cherry Point was an outlier for CONUS community hospitals in FY90, and was not among the modeled facilities.

2.3.3 AMBULATORY EXPENSES

The model specifications for FY90 ambulatory expenses was

$$AMBEXP\$ = (B_0 + B_1*AWU) * (1 + C_1*D\_NAVY) * (1 + C_2*D\_USAF);$$

where:

AMBEXP$ = ambulatory expense; and

AWU = ambulatory work units.

Here B_1 expresses the marginal cost of providing one AWU of healthcare. Due to the fact that they were outliers, Walter Reed AMC was excluded from the FY90 medical center models, Womack AH, NH Long Beach, and BRH NAVSTA Adak were excluded from the CONUS community hospital models, and NH Okinawa was excluded from the overseas hospital models. For both FY88 and FY89, NH Bethesda was eliminated from the modeled medical centers. For FY88, Wilford Hall Medical Center was excluded from the medical center modeling as well. For FY89, Womack AH and BRH NAVSTA Adak were excluded from CONUS community hospital models. For FY89 and FY90, NMCL Port Hueneme was excluded from the clinic models, along with NMCL Quantico in the FY89 model and NMCL Pearl Harbor in the FY90 model.

2.3.4 PARAMETER ESTIMATES

The final model parameters for all medical center models, along with comparisons among models of different years, are presented in exhibit 2-3. The CONUS community hospital models are displayed in exhibit 2-4. Exhibit 2-5 contains the overseas hospital models and comparisons. Medical clinic models are presented in exhibit 2-6. The models are summarized by Service branch in exhibits 2-7 through 2-9. Army medical center, CONUS community hospital, overseas hospital, and clinic models are shown in exhibit 2-7. Navy models, with the Navy Service branch percentage adjustment applied to the intercept and workload coefficients, are displayed in exhibit 2-8. Finally, Air Force models for each expense category and facility type, with the intercept and workload coefficients adjusted, are shown in exhibit 2-9.

One should be cautious in drawing conclusions from the percentage difference for any given parameter, between different years or grouper versions, for several reasons. The first is that there has been no

EXHIBIT 2-3: COMPARISON OF MEDICAL CENTER FY88, FY89, FY90 VERSION 4, AND FY90 VERSION 8 MEPRS COST MODEL PARAMETERS

EXPENSE TYPE	VARIABLES	PARAMETER ESTIMATES				PERCENT CHANGES			
		FY88	FY89	FY90 Version 4	FY90 Version 8	FY88 to FY89	FY88 to FY90 Version 4	FY88 to FY90 Version 8	FY90 Version 4 to FY90 Version 8
INPATIENT NONCLINICIAN	INTERCEPT	-$0 $3,313	$2,042	$6,867	$7,951	N/A	N/A	N/A	15.78%
	IWU	$2.026	$1.907	$1.659	$1.653	-5.89%	-18.15%	-18.42%	-0.33%
	D_NAVY	-1.20%	4.08%	10.33%	3.84%	5.28%	11.53%	5.04%	-6.49%
	D_USAF	9.72%	9.45%	9.30%	7.05%	-0.26%	-0.41%	-2.67%	-2.25%
	GME INT	4.00%	4.00%	4.00%	4.00%				
	EXCLUDED FROM MODELING:	none	NH Bethesda	NH Bethesda Tripler AMC	NH Bethesda Tripler AMC				
INPATIENT CLINICIAN	D_ARMY*IWU	$0.142	$0.165	$0.167	$0.170	15.96%	17.31%	19.13%	1.55%
	D_NAVY*IWU	$0.193	$0.191	$0.172	$0.164	-0.89%	-10.78%	-15.25%	5.02%
	D_USAF*IWU	$0.149	$0.150	$0.134	$0.138	1.01%	-9.58%	-8.98%	0.67%
	EXCLUDED FROM MODELING:	NH Bethesda	NH Bethesda	NH Bethesda	NH Bethesda				
AMBULATORY	INTERCEPT	$10,315	$5,814	$8,340	$8,340	-43.64%	-19.15%	-19.15%	- - -
	AWU	$1.541	$2.021	$1.983	$1.983	31.15%	28.63%	28.63%	- - -
	D_NAVY	27.08%	15.47%	28.54%	28.54%	-11.61%	1.46%	1.46%	- - -
	D_USAF	-9.01%	5.05%	6.86%	6.86%	14.06%	15.87%	15.87%	- - -
	EXCLUDED FROM MODELING:	NH Bethesda Wilford Hall MC	NH Bethesda	Walter Reed AMC	Walter Reed AMC				

Note: Dollars stated in thousands

EXHIBIT 2-4: COMPARISON OF CONUS COMMUNITY HOSPITAL FY88, FY89, FY90 VERSION 4, AND FY90 VERSION 8 MEPRS COST MODEL PARAMETERS

EXPENSE TYPE	VARIABLES	PARAMETER ESTIMATES				PERCENT CHANGES			
		FY88	FY89	FY90 Version 4	FY90 Version 8	FY88 to FY89	FY88 to FY90 Version 4	FY88 to FY90 Version 8	FY90 Version 4 to FY90 Version 8
INPATIENT NONCLINICIAN	INTERCEPT	$659	$721	$752	$831	9.37%	14.08%	26.00%	10.45%
	IWU	$1.748	$1.897	$1.905	$1.920	8.52%	8.96%	9.84%	0.81%
	D_NAVY	29.62%	24.28%	34.46%	26.48%	-5.34%	4.84%	-3.14%	-7.98%
	D_USAF	2.33%	1.23%	8.35%	7.29%	-1.10%	6.02%	4.96%	-1.06%
	EXCLUDED FROM MODELING:	Womack AH	Womack AH	Womack AH	Womack AH				...
INPATIENT CLINICIAN	D_ARMY*IWU	$0.103	$0.110	$0.109	$0.110	7.17%	5.84%	6.72%	1.81%
	D_NAVY*IWU	$0.180	$0.166	$0.166	$0.145	-8.02%	-8.28%	-7.22%	-5.05%
	D_USAF*IWU	$0.096	$0.096	$0.109	$0.110	4.06%	13.80%	15.25%	1.72%
	EXCLUDED FROM MODELING:	none	NH Cherry Point	NH Cherry Point	NH Cherry Point				
AMBULATORY	INTERCEPT	$857	$1,192	$1,145	$1,146	39.05%	33.59%	33.63%	---
	AWU	$1.707	$1.876	$2.039	$2.039	9.93%	19.50%	19.50%	---
	D_NAVY	36.71%	26.86%	24.53%	24.52%	-9.85%	-12.18%	-12.19%	---
	D_USAF	10.78%	3.73%	3.20%	3.20%	-7.05%	-7.58%	-7.58%	---
	EXCLUDED FROM MODELING:	none	Womack AH BRH NAVSTA Adak	Womack AH NH Long Beach BRH NAVSTA Adak	Womack AH NH Long Beach BRH NAVSTA Adak				

Note: Dollars stated in thousands

EXHIBIT 2-5: COMPARISON OF OVERSEAS HOSPITAL FY88, FY89, FY90 VERSION 4, AND FY90 VERSION 8 MEPRS COST MODEL PARAMETERS

EXPENSE TYPE	VARIABLES	PARAMETER ESTIMATES				PERCENT CHANGES			
		FY88	FY89	FY90 Version 4	FY90 Version 8	FY88 to FY89	FY88 to FY90 Version 4	FY88 to FY90 Version 4	FY90 Version to FY90 Version 8
INPATIENT NONCLINICIAN	INTERCEPT	$492	$620	$477	$511	25.97%	-3.00%	3.85%	7.05%
	IWU	$1.948	$2.114	$2.383	$2.402	8.53%	22.34%	23.33%	0.81%
	D_NAVY	14.36%	8.85%	0.97%	-3.67%	-5.51%	-13.39%	-18.03%	-4.64%
	D_USAF	-9.31%	-16.46%	-11.65%	-13.67%	-7.15%	-2.34%	-4.36%	-2.02%
	EXCLUDED FROM MODELING:	none	97th Gen Hosp-Frankfurt	NH Okinawa 2nd Gen Hosp-Landstuhl	NH Okinawa 2nd Gen Hosp-Landstuhl				
INPATIENT CLINICIAN	D_ARMY*IWU	$0.146	$0.149	$0.159	$0.160	2.01%	9.05%	9.55%	1.40%
	D_NAVY*IWU	$0.157	$0.135	$0.152	$0.146	-14.19%	-3.58%	-7.32%	3.86%
	D_USAF*IWU	$0.092	$0.102	$0.097	$0.096	10.71%	4.81%	3.84%	.92%
	EXCLUDED FROM MODELING:	none	none	none	none				
AMBULATORY	INTERCEPT	$1,884	$1,310	$1,423	$1,423	-30.45%	-24.49%	-24.49%	- - -
	AWU	$1.951	$2.229	$2.442	$2.442	14.22%	25.15%	25.15%	- - -
	D_NAVY	13.80%	14.94%	-3.08%	-3.08%	1.14%	-16.88%	-16.88%	- - -
	D_USAF	-19.10%	-20.80%	-16.67%	-16.67%	-1.70%	2.43%	2.43%	- - -
	EXCLUDED FROM MODELING:	none	97th Gen Hosp-Frankfurt	NH Okinawa	NH Okinawa				

Note: Dollars stated in thousands

EXHIBIT 2-6: COMPARISON OF CLINIC FY88, FY89, AND FY90 MEPRS COST MODEL PARAMETERS

EXPENSE TYPE	VARIABLES	PARAMETER ESTIMATES			PERCENT CHANGES	
		FY88	FY89	FY90	FY88 TO FY89	FY88 TO FY90
AMBULATORY	INTERCEPT	$1,667	$856	$913	-48.66%	-45.25%
	IWU	$1.758	$2.345	$2.624	33.38%	49.27%
	D_NAVY	3.65%	1.16%	3.60%	-2.49%	-0.04%
	D_USAF	-28.74%	-17.99%	-20.09%	10.75%	8.65%
	EXCLUDED FROM MODELING:	none	NMCL Quantico NMCL Port Hueneme	NMCL Pearl Harbor NMCL Port Hueneme		

Note: Dollars stated in thousands

EXHIBIT 2-7: COMPARISON OF ARMY REDUCED FORM FY88, FY89, FY90 VERSION 4, AND FY90 VERSION 8 MEPR COST MODEL PARAMETERS

	EXPENSE TYPE	VARIABLES	PARAMETER ESTIMATES				PERCENT CHANGES			
			FY88	FY89	FY90 Version 4	FY90 Version 8	FY88 TO FY89	FY88 TO FY90 Version 4	FY88 TO FY90 Version 8	FY90 Version to FY90 Version 8
Medical Centers	INPATIENT NONCLINICIAN	INTERCEPT	-$3,313.113	$2,042.462	$6,867.340	$7,950.864	N/A	N/A	N/A	15.8%
		IWU	$2.026	$1.907	$1.659	$1.653	-5.9%	-18.2%	-18.4%	-0.3%
		GME INT	4.00%	4.00%	4.00%	4.00%				
	INPATIENT CLINICIAN	D_ARMY*IWU	$0.142	$0.165	$0.167	$0.170	16.0%	17.3%	19.1%	1.5%
	AMBULATORY	INTERCEPT	$10,315.465	$5,813.707	$8,340.005	$8,340.005	-43.6%	-19.2%	-19.2%	----
		AWU	$1.541	$2.021	$1.983	$1.983	31.1%	28.6%	28.6%	----
CONUS Comm Hospitals	INPATIENT NONCLINICIAN	INTERCEPT	$659.239	$720.745	$752.073	$830.668	9.3%	14.1%	26.0%	10.5%
		IWU	$1.748	$1.897	$1.905	$1.920	8.5%	9.0%	9.8%	0.8%
	INPATIENT CLINICIAN	D_ARMY*IWU	$0.103	$0.110	$0.106	$0.110	6.8%	5.3%	6.7%	1.3%
	AMBULATORY	INTERCEPT	$857.382	$1,192.155	$1,145.694	$1,145.694	39.0%	33.6%	33.6%	----
		AWU	$1.707	$1.876	$2.039	$2.039	9.9%	19.5%	19.5%	----
Overseas Hospitals	INPATIENT NONCLINICIAN	INTERCEPT	$492.192	$619.876	$477.441	$511.118	25.9%	-3.0%	3.8%	7.1%
		IWU	$1.948	$2.114	$2.383	$2.402	8.5%	22.3%	23.3%	0.8%
	INPATIENT CLINICIAN	D_ARMY*IWU	$0.148	$0.148	$0.159	$0.160	1.8%	8.0%	8.6%	1.4%
	AMBULATORY	INTERCEPT	$1,883.923	$1,310.260	$1,422.539	$1,422.539	-30.5%	-24.5%	-24.5%	----
		AWU	$1.951	$2.229	$2.442	$2.442	14.2%	25.1%	25.1%	----
Clinics	AMBULATORY	INTERCEPT	$1,667.443	$356.110	$912.860	$912.860	-48.7%	-45.3%	-45.3%	----
		AWU	$1.758	$2.345	$2.624	$2.624	33.4%	49.3%	49.3%	----

Note: Dollars stated in thousands

EXHIBIT 2-8: COMPARISON OF NAVY REDUCED FORM FY88, FY89, FY90 VERSION 4, AND FY90 VERSION 8 MEPRS COST MODEL PARAMETERS

	EXPENSE TYPE	VARIABLES	PARAMETER ESTIMATES				PERCENT CHANGES			
			FY88	FY89	FY90 Version 4	FY90 Version 8	FY88 TO FY89	FY88 TO FY90 Version 4	FY88 TO FY90 Version 8	FY90 Version 4 to FY90 Version 8
Medical Centers	INPATIENT NONCLINICIAN	INTERCEPT	-$3,273.282	$2,125.717	$7,576.640	$8,256.241	N/A	N/A	N/A	9.0%
		IWU	$2.002	$1.985	$1.830	$1.717	-0.9%	-8.6%	-14.3%	-6.2%
		GME INT	4.00%	4.00%	4.00%	4.00%				
	INPATIENT CLINICIAN	D_ARMY*IWU	$0.193	$0.191	$0.172	$0.164	-0.9%	-10.8%	-15.3%	-5.0%
	AMBULATORY	INTERCEPT	$13,108.872	$6,713.215	$10,720.051	$10,720.051	-48.8%	-18.2%	-18.2%	----
		AWU	$1.959	$2.334	$2.548	$2.548	19.2%	30.1%	30.1%	----
CONUS Comm Hospitals	INPATIENT NONCLINICIAN	INTERCEPT	$854.537	$895.760	$1,011.221	$1,050.640	4.8%	18.3%	22.9%	3.9%
		IWU	$2.266	$2.358	$2.561	$2.429	4.0%	13.0%	7.2%	-5.2%
	INPATIENT CLINICIAN	D_ARMY*IWU	$0.160	$0.155	$0.166	$0.148	-3.1%	-2.3%	-7.2%	-5.1%
	AMBULATORY	INTERCEPT	$1,172.137	$1,512.417	$1,426.679	$1,426.679	29.0%	21.7%	21.7%	----
		AWU	$2.333	$2.380	$2.540	$2.540	2.0%	8.8%	8.8%	----
Overseas Hospitals	INPATIENT NONCLINICIAN	INTERCEPT	$562.861	$674.722	$482.084	$492.380	19.9%	-14.4%	-12.5%	2.1%
		IWU	$2.228	$2.302	$2.406	$2.314	3.3%	8.0%	3.9%	-3.8%
	INPATIENT CLINICIAN	D_ARMY*IWU	$0.157	$0.135	$0.152	$0.145	-14.3%	-3.5%	-7.3%	-3.9%
	AMBULATORY	INTERCEPT	$2,143.878	$1,505.979	$1,378.740	$1,378.740	-29.8%	-35.7%	-35.7%	----
		AWU	$2.220	$2.562	$2.367	$2.367	15.4%	6.6%	6.6%	----
Clinics	AMBULATORY	INTERCEPT	$1,728.244	$866.029	$945.764	$945.764	-49.9%	-45.3%	-45.3%	----
		AWU	$1.822	$2.372	$2.719	$2.719	30.2%	49.2%	49.2%	----

Note: Dollars stated in thousands

EXHIBIT 2-9: COMPARISON OF AIR FORCE REDUCED FORM FY88, FY89, FY90 VERSION 4, AND FY90 VERSION 8 MEPRS COST MODEL PARAMETERS

	EXPENSE TYPE	VARIABLES	PARAMETER ESTIMATES				PERCENT CHANGES			
			FY88	FY89	FY90 Version 4	FY90 Version 8	FY88 TO FY89	FY88 TO FY90 Version 4	FY88 TO FY90 Version 8	FY90 Version 4 TO FY90 Version 8
Medical Centers	INPATIENT NONCLINICIAN	INTERCEPT	$3,634.985	$2,235.527	$7,506.216	$8,511.257	N/A	N/A	N/A	13.4%
		IWU	$2.223	$2.087	$1.813	$1.770	-6.1%	-18.5%	-20.4%	-2.4%
		GME INT	4.00%	4.00%	4.00%	4.00%				
	INPATIENT CLINICIAN	D_ARMY*IWU	$0.149	$0.159	$0.134	$0.135	1.0%	-9.6%	-9.0%	0.7%
	AMBULATORY	INTERCEPT	$9,386.021	$6,107.287	$8,912.379	$8,912.379	-34.9%	-5.0%	-5.0%	----
		AWU	$1.402	$2.123	$2.119	$2.119	51.4%	51.1%	51.1%	----
CONUS Comm Hospitals	INPATIENT NONCLINICIAN	INTERCEPT	$674.585	$729.635	$814.853	$891.182	8.2%	20.8%	32.1%	9.4%
		IWU	$1.789	$1.920	$2.064	$2.060	7.4%	15.4%	15.2%	-0.2%
	INPATIENT CLINICIAN	D_ARMY*IWU	$0.095	$0.099	$0.108	$0.110	3.7%	13.3%	15.2%	1.7%
	AMBULATORY	INTERCEPT	$949.770	$1,236.582	$1,182.404	$1,182.404	30.2%	24.5%	24.5%	----
		AWU	$1.890	$1.946	$2.105	$2.105	2.9%	11.3%	11.3%	----
Overseas Hospitals	INPATIENT NONCLINICIAN	INTERCEPT	$446.371	$517.819	$421.804	$441.230	16.0%	-5.5%	-1.2%	4.6%
		IWU	$1.767	$1.766	$2.105	$2.074	0.0%	19.2%	17.4%	-1.5%
	INPATIENT CLINICIAN	D_ARMY*IWU	$0.092	$0.102	$0.097	$0.096	10.4%	4.9%	3.8%	-0.9%
	AMBULATORY	INTERCEPT	$1,524.045	$1,037.786	$1,185.337	$1,185.337	-31.9%	-22.2%	-22.2%	----
		AWU	$1.578	$1.765	$2.035	$2.035	11.8%	28.9%	28.9%	----
Clinics	AMBULATORY	INTERCEPT	$1,188.256	$702.100	$729.482	$729.482	-40.9%	-38.6%	-38.6%	----
		AWU	$1.253	$1.923	$2.097	$2.097	53.5%	67.4%	67.4%	----

Note: Dollars stated in thousands

accounting for inflation. The second is that while any of these point estimates may appear to be quite different, the standard error involved in estimating them may be large enough that they may not be statistically different. Finally, note that often the intercept term and marginal cost term change in different directions from one year or grouper version to another. Taken together, these changes serve to mitigate the change observed for one parameter alone. Insofar as possible, the entire models, rather than the individual components, should be compared from year to year. These comparisons were conducted as part of this analysis. The results are presented in the next chapter.

3.0 MODEL ACCURACY AND STABILITY ANALYSIS

This chapter discusses two sets of comparisons for the FY90 Version 8 models:

- a comparison of observed FY90 expenses to expenses predicted by the FY90 Version 8 models, in order to evaluate FY90 model accuracy; and
- a comparison of FY90 expenses projected based upon the FY90 Version 8 models to those based upon the FY88 Version 4 models, in order to assess model stability.

These comparisons are presented for each MTF and for each expense category and total expenses summed across all categories. The degree to which FY90 models replicate FY90 expenses is a measure of model accuracy. The degree to which FY88 models (using FY90 workload and graduate medical education data as inputs) replicate FY90 model predictions is a measure of model stability. It must be noted that while accuracy is an evaluation of the usefulness of a particular model for a particular year, stability is a function of all components of the modeling process used in estimating parameters for different years, including the underlying structure of health care delivery, the data, and the model specification. If data are not consistently or accurately reported from year to year, or if the underlying structure of health care provision changes from year to year, any given year's model may be accurate for that year, but not useful in projecting budgets for subsequent years.

This chapter consists of five sections, corresponding to the four facility types modeled plus a summary section that discusses total expenses and examines the role that the Partnership Program expenses and workload may have played in the modeling results. Section 3.1 discusses model accuracy and stability analysis for medical centers, section 3.2 evaluates the accuracy and stability for CONUS community hospital models, section 3.3 presents model accuracy and stability analysis for

overseas hospitals, and section 3.4 assesses the clinic model accuracy and stability. Within each of the first three sections, inpatient non-clinician, inpatient clinician, and ambulatory expense models are addressed separately. Section 3.5 addresses model stability and accuracy for total expenses and discusses the extent to which CHAMPUS Partnership expenses and workload may affect model parameters. The remainder of this introductory section provides an overview of the model evaluation and summary results.

Overview of Model Evaluation

In evaluating FY90 Version 8 model accuracy, the predicted FY90 expenses of these models were compared to actual FY90 expenses, for each model. The degree to which the predicted expense approximated the actual expense was measured in percentage terms, and an error bound of 25 percent was used to illustrate those MTFs that had predicted expenses that differed considerably from observed expenses.[1]

The importance of stability lies in the issue of whether models developed using a given year's data are useful in allocating budgets for subsequent years and grouper versions. If the budget projections provided by the FY88 (Version 4) and FY90 (Version 8) models are generally similar, then the models are stable between the two years, and there is no reason that one year's model cannot be used to project expenses for subsequent years.

The procedure for assessing inpatient model stability was to compare MTF projected budgets using the FY88 and FY90 Version 8 models, with FY90 workload as the independent variable for both models. For the FY88 models, Version 4 workload was input. The FY90 Version 8

[1]The error bound of 25% was used as a simple mechanism to identify outliers; it is straightforward to interpret and is not meant to imply statistical significance.

projections were performed using Version 8 workload. The FY88 projections were then adjusted by an estimated rate of inflation to allow comparisons. Finally, the differences between the projections for each MTF were examined in order to determine how many facilities had profound differences between the level of expenses projected by each model. PRIMUS/NAVCARE and Occupational Health clinic expenses and workload were excluded from the modeling, because these activities will not be included in the DRG-based resource allocation.

The method for computing inflation involved comparing FY90 observed expenses to expenses projected by FY88 models (using FY90 Version 4 workload). Facilities that were excluded from either the FY88 or FY90 parameter estimation were also excluded from the inflation computation. Inflation factors were computed by expense category over all MTFs. The inflation factors for each expense type were:

- 10.56% for inpatient nonclinician expenses;
- 4.05% for inpatient clinician salaries; and
- 16.26% for ambulatory expenses.

These inflation factors were then used to adjust FY88 model predictions in order to state the dollar value of these projections in FY90 terms.

A chart displaying the number of facilities whose projected expenses using the FY88 (Version 4) and FY90 Version 8 models differed from observed FY90 expenses by more than 25% is presented in exhibit 3-1. The exhibit illustrates counts of facilities for which the respective ratio of predicted to observed expense is less than 0.75 or greater than 1.25. Separate counts are provided for each of the projection models examined. In addition, a comparison of total estimated inpatient and outpatient expenses (computed by summing the estimates from each model for each facility) to total observed expenses is presented. Thus, if separate models underestimated inpatient expenses and

EXHIBIT 3-1: SUMMARY COUNTS OF HOSPITALS WITH FY90 MODEL PREDICTED TOTAL EXPENSES NOT WITHIN 25% OF ACTUAL FY90 TOTAL EXPENSES

	ARMY		NAVY		USAF		ALL SERVICES	
	FY88	FY90	FY88	FY90	FY88	FY90	FY88	FY90
MEDICAL CENTER EXPENSE MODELS								
NONCLINICIAN EXPENSES	1	0	1	1	0	0	2	1
CLINICIAN EXPENSES	2	2	2	1	2	1	6	4
AMBULATORY EXPENSES	0	0	0	0	0	0	0	0
TOTAL EXPENSES*	0	0	0	0	0	0	0	0
FACILITIES ESTIMATED**	8	8	4	4	6	6	18	18
CONUS COMMUNITY HOSPITAL MODELS								
NONCLINICIAN EXPENSES	5	5	4	3	8	9	17	17
CLINICIAN EXPENSES	12	9	9	10	18	18	39	37
AMBULATORY EXPENSES	2	1	4	6	6	5	12	12
TOTAL EXPENSES*	1	1	3	4	5	5	9	10
FACILITIES ESTIMATED**	29	29	21	21	59	59	109	109
OVERSEAS HOSPITAL MODELS								
NONCLINICIAN EXPENSES	2	3	2	2	2	2	6	7
CLINICIAN EXPENSES	0	1	6	6	5	6	11	13
AMBULATORY EXPENSES	0	0	5	2	5	3	10	5
TOTAL EXPENSES*	0	0	2	2	4	3	6	5
FACILITIES ESTIMATED**	11	11	9	9	14***	14***	34	34
SUM OVER ALL HOSPITAL MODELS								
NONCLINICIAN EXPENSES	8	8	7	6	10	11	25	25
CLINICIAN EXPENSES	14	12	17	17	25	25	56	54
AMBULATORY EXPENSES	2	1	9	8	11	8	22	17
TOTAL EXPENSES*	1	1	5	6	9	8	15	15
FACILITIES ESTIMATED**	48	48	34	34	79	79	161	161

*The Modeled to Observed Expense Ratio for Total Expenses is the ratio of the sum of the modeled expenses for each model component (nonclinician, clinician, and ambulatory expenses) to the sum of the observed expenses within each component.

**This is the number of facilities for which modeled and observed expenses were compared.

***The number of Air Force overseas hospitals for which modeled and observed expenses were compared was 13 for inpatient expenses, 14 for outpatient expenses, due to the fact that inpatient Biometrics data for USAF Hospital Iraklion were not available, precluding computation of inpatient workload.

overestimated ambulatory expenses, the result may be an accurate estimate of total expenses. Note, since clinician salaries are a small component of total expenses (generally about five percent), the fact that these expenses are not accurately estimated has little influence on the accuracy of the estimate of total expenses. It can be seen from exhibit 3-1 that only 15 of 161 hospitals in FY90 had a difference between modeled and observed total expenses greater than 25 percent for either the FY88 or the FY90 models.

Over all hospitals, there were generally fewer MTFs with significant error in estimates of total expenses than for any of the three components of total expenses. Thus, there appears to be a tendency to overestimate one component of total expense while underestimating another component. This error will then be compensated for when the components are summed. A possible explanation for this tendency is that facilities may be assigning expenses between inpatient and outpatient accounts that do not fully reflect incurred expenses. For example, if administrative expenses are disproportionately assigned to inpatient accounts, then inpatient care expenses may be underestimated while outpatient expenses are overestimated. However, total expenses may be properly estimated in this example.

The following table summarizes the comparison of clinic model FY90 predictions to actual FY90 expenses.

Clinics with > 25% Difference Between Modeled and Actual FY90 Expenses

	Army		Navy		USAF		Total	
	FY88 Model	FY90 Model	FY88 Model	FY90 Model	FY88 Model	FY90 Model	FY88 Model	FY90 Model
# of Clinics with > 25% Difference	0	0	5	5	6	4	11	9
Facilities Estimated	2	2	9	9	40	40	51	51

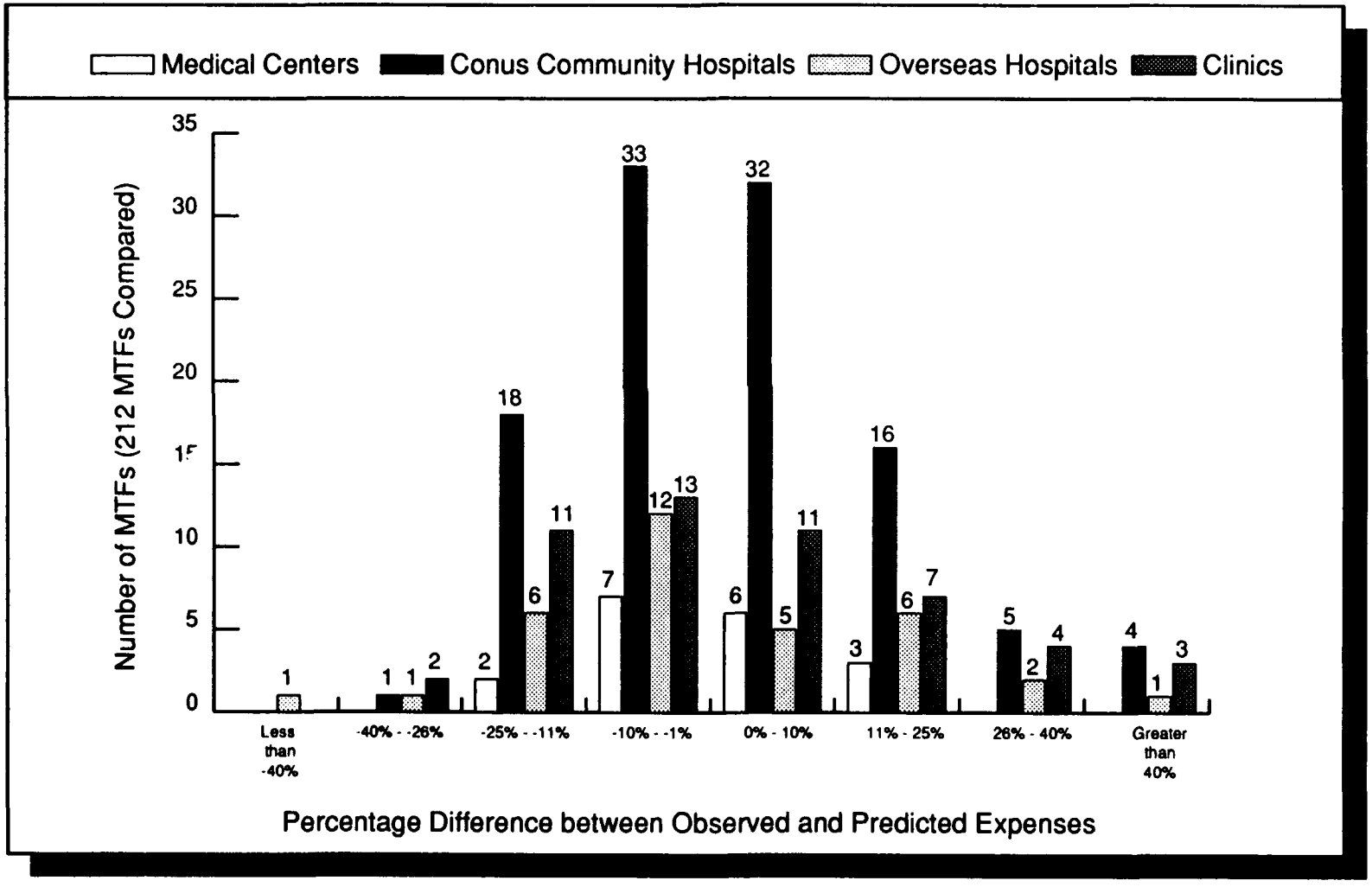
As with hospitals, PRIMUS/NAVCARE and Occupational Health clinic expenses and workload were excluded from the modeling. The exhibit identifies 11 clinics having observed FY90 expenses more than 25% different from those predicted by the FY88 model, and nine that have observed FY90 expenses more than 25% different from those predicted by the FY90 model.

An alternative view of the differences between projected and observed expenses is presented in exhibit 3-2. The histogram displays the number of facilities having projected total expenses differing from observed total expenses by a given percentage range. As with the previous exhibit, total expenses for each MTF refers to the sum of expenses across all expense categories for the given MTF. It can be seen from exhibit 3-2 that 119 of 212 of all facilities (67%), and 96 of 161 hospitals (59%) in FY90 had a difference between modeled and observed total expenses within 10 percent.

Overview of Stability Analysis

In terms of assessing stability, the necessity of focusing on the differences in model projections rather than on the differences between FY88 model projections of FY90 expenses and observed FY90 expenses was demonstrated earlier in exhibits 3-1 and 3-2. Even models based upon FY90 expenses and Version 8 workload resulted in FY90 projections which were more than 25% different from observed FY90 expenses. The critical test is whether a model based upon earlier years' data would yield radically different projections than a model based in the projection year itself. Put another way, the goal of the analysis was to determine whether the alternative model projections would produce different sets of facilities which had projected expenses varying excessively from observed expenses.

EXHIBIT 3-2: HISTOGRAM OF PERCENTAGE DIFFERENCES BETWEEN FY90 OBSERVED TOTAL EXPENSES AND FY90 VERSION 8 MODEL PREDICTED EXPENSES: ALL FACILITIES



One view of stability was presented in the previous section, identifying the facilities having both FY88 and FY90 model predicted total expenses different from observed FY90 total expenses by more than 25%. To an overwhelming extent, the facilities that were identified as having actual FY90 expenses considerably different from one year's model projections were also the facilities identified as having FY90 expenses considerably different from the other year's model projections. Therefore, at an aggregate level of expense, the models appeared to be very stable.

At a more detailed level, the procedure for assessing model stability was to compare MTF projected budgets using the FY88 models to those projected using FY90 Version 8 models, with FY90 workload and GME factors as the independent variables for both models. For the FY88 models, Version 4 workload was input. The FY90 Version 8 projections were performed using Version 8 workload. The FY88 projections were then adjusted by an estimated rate of inflation to allow comparisons. Finally, the differences between the projections for each MTF were examined in order to determine how many facilities had profound differences between the level of expenses projected by each model. The results of this procedure are summarized in exhibit 3-3. This exhibit presents counts of facilities for which the FY90 expenses predicted by the FY90 (Version 8) model were either less than 90% of those predicted by the FY88 model or greater than 110% of those predicted by the FY88 model.[1] Separate counts are provided for each of the expense categories examined, and for total expenses predicted for each facility. Ten percent was chosen as the critical point in assessing stability, rather than the 25% used in evaluating model accuracy because any variation in cost not attributable to workload has been removed from both sets of model parameters.

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[1]The error bound of 10% is used as a simple mechanism to identify outliers; it is straightforward to interpret and is not meant to imply statistical significance.

EXHIBIT 3-3: SUMMARY COUNTS OF HOSPITALS WITH FY90 MODEL PREDICTED TOTAL EXPENSES NOT WITHIN 10% OF FY88 MODEL PREDICTED TOTAL EXPENSES

	ARMY	NAVY	USAF	ALL SERVICES
MEDICAL CENTER EXPENSE MODELS				
NONCLINICIAN EXPENSES	2	1	4	7
CLINICIAN EXPENSES	6	4	6	16
AMBULATORY EXPENSES	0	2	4	6
TOTAL EXPENSES*	1	0	2	3
FACILITIES ESTIMATED**	8	4	6	18
CONUS COMMUNITY HOSPITAL MODELS				
NONCLINICIAN EXPENSES	1	4	7	12
CLINICIAN EXPENSES	0	10	14	24
AMBULATORY EXPENSES	0	0	0	0
TOTAL EXPENSES*	0	0	0	0
FACILITIES ESTIMATED**	29	21	59	109
OVERSEAS HOSPITAL MODELS				
NONCLINICIAN EXPENSES	5	0	3	8
CLINICIAN EXPENSES	0	1	1	2
AMBULATORY EXPENSES	0	9	4	13
TOTAL EXPENSES*	0	5	1	6
FACILITIES ESTIMATED**	11	9	14***	34
SUM OVER ALL HOSPITAL MODELS				
NONCLINICIAN EXPENSES	8	5	14	27
CLINICIAN EXPENSES	6	15	21	42
AMBULATORY EXPENSES	0	11	8	19
TOTAL EXPENSES*	1	5	3	9
FACILITIES ESTIMATED**	48	34	79	161

*The Modeled to Observed Expense Ratio for Total Expenses is the ratio of the sum of the modeled expenses for each model component (nonclinician, clinician, and ambulatory expenses) to the sum of the observed expenses within each component.

**This is the number of facilities for which modeled and observed expenses were compared.

***The number of Air Force overseas hospitals for which modeled and observed expenses were compared was 13 for inpatient expenses, 14 for outpatient expenses, due to the fact that inpatient Biometrics data for USAF Hospital Iraklion were not available, precluding computation of inpatient workload.

Therefore, there should be less variation involved in comparing two sets of projections (if the models are stable), than would be involved in comparing actual expenses (which still contain variations in cost not strictly attributable to differences in workload), implying that a more rigorous test is appropriate.

It can be seen from exhibit 3-3 that in general, the predictions for total expenses were closer than for any individual expense category. This finding suggests that the model projections are more stable when considered in the aggregate than for the individual expense components. Only nine facilities out of 161 had total expenses predicted by the models which differed from each other by more than ten percent. Of these nine MTFs, there were no CONUS community hospitals, three were medical centers, and six were overseas hospitals. This finding indicates that the CONUS community hospital models may be relatively more stable than the medical center or overseas hospital expenses.

The following table summarizes the comparison of clinic model FY90 predictions to clinic model FY88 predictions.

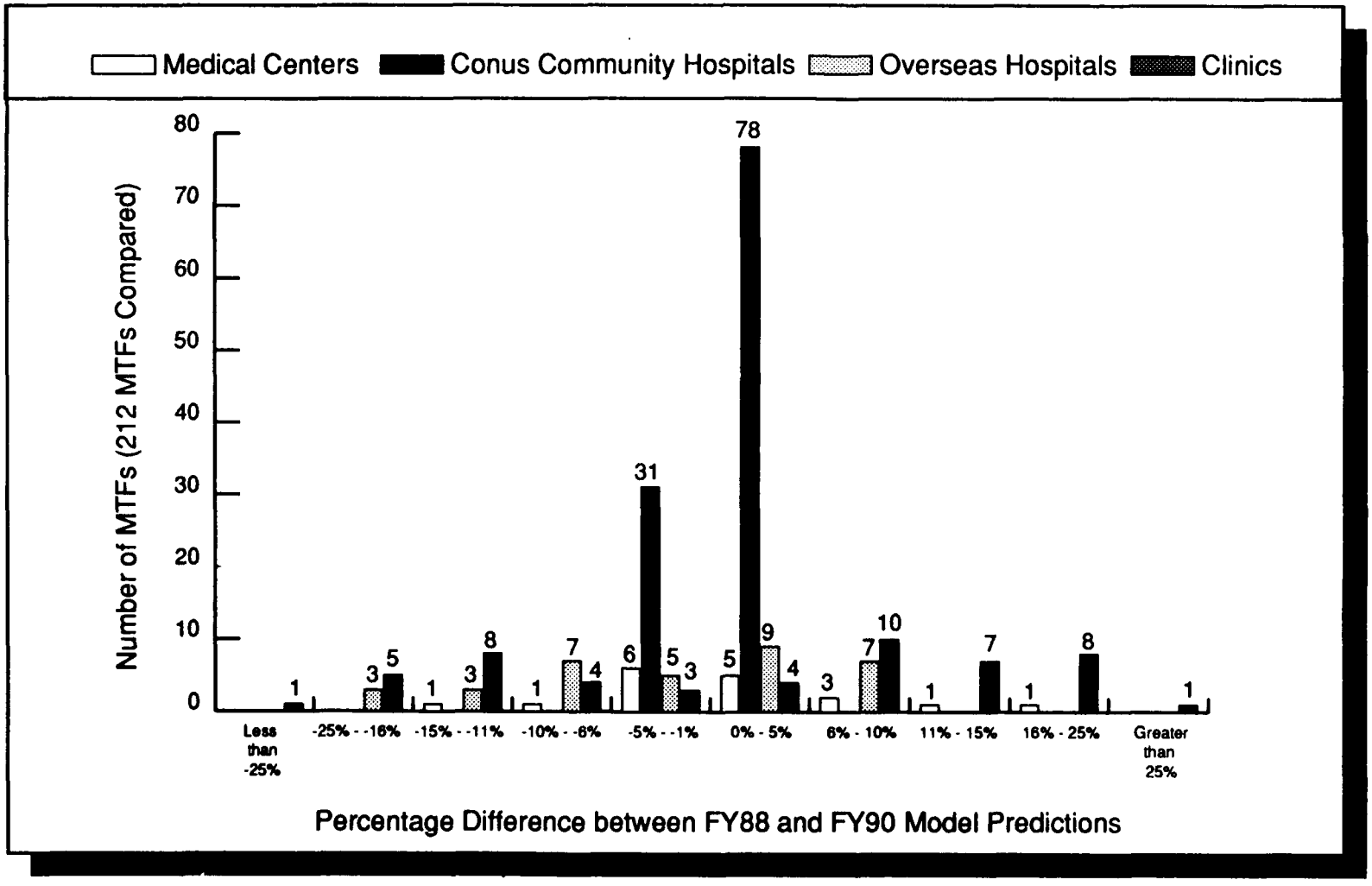
Clinics with > 10% Difference Between FY90 Expenses Predicted by FY90 and FY88 Models

	Army	Navy	USAF	Total
# of Clinics with > 10% Difference	2	5	23	30
Facilities Estimated	2	9	40	51

This illustration reveals that clinic models may be slightly less stable than the hospital models, when considering how closely the models replicate each other's predictions.

An alternative view of the differences between model projections is presented in exhibit 3-4. The histogram displays the number of facilities having FY90 total expenses projected by the FY90 models

EXHIBIT 3-4: HISTOGRAM OF PERCENTAGE DIFFERENCES BETWEEN FY90 BUDGETS PREDICTED BY FY88 AND FY90 MODELS: ALL FACILITIES



differing from FY90 total expenses projected by the FY88 models by a given percentage range. As with the previous exhibit, total expenses for each MTF refers to the sum of expenses across all expense categories for the given MTF. It can be seen from exhibit 3-4 that 141 of 212 facilities (67%) in FY90 had a difference between the alternative model projections of less than five percent. While this is a fairly high percentage, it is even higher when considering inpatient facilities alone; for hospitals, the figure was 134 out of 161 MTFs (83%). Within inpatient facilities, CONUS community hospital FY90 model projections, representing 109 facilities, differed from FY88 model projections by five percent or less. For medical centers, 11 of 18 MTF FY90 model projections (61%) were within five percent of the FY88 projections, while 15 (83%) were within ten percent. For overseas hospitals, 14 of 34 MTF FY90 model projections (41%) differed from FY88 model projections by five percent or less, and 28 (82%) differed by ten percent or less. Finally, only seven of 51 clinic FY90 model projections (14%) were within five percent of the FY88 projections, with 21 clinics (41%) differing by ten percent or less. These figures suggest a fairly high degree of stability in the medical center and hospital models (particularly CONUS community hospitals), with a lower degree of stability present in the clinic models.

3.1 MEDICAL CENTERS

This section provides a detailed presentation of estimates obtained from medical center expense models. Inpatient nonclinician expenses, inpatient clinician salaries, and ambulatory expenses are discussed separately.

Inpatient Nonclinician Expenses

Observed FY90 expenses and FY90 expenses projected by FY88 and FY90 models are presented in exhibit 3-5. NH Bethesda and Tripler AMC were excluded from the medical center inpatient nonclinician modeling effort due to cost/workload relationships substantially different from other medical centers; keeping the data for these two facilities caused unrepresentative results. In terms of FY90 model accuracy, only NH Bethesda had projected expenses more than 25% different from actual FY90 expenses. Interestingly, while NH Bethesda's inpatient nonclinician expenses were considerably overestimated, its inpatient clinician expenses were considerably underestimated, suggesting a difference between how NH Bethesda and other medical centers determine the portion of inpatient expenses attributable to inpatient clinician salaries. Indeed, an examination of the MEPRS expense data revealed that while all other Navy medical centers have a ratio of inpatient nonclinician expenses to total inpatient expenses of over 92%, NH Bethesda's ratio was 84%. The other medical center excluded from the FY90 inpatient nonclinician expense modeling, Tripler AMC, had FY90 model projected expenses 19% less than observed. USAF Medical Center Scott had projected and actual expenses differing by 25%, while other Air Force medical centers had FY90 model projected and observed expenses that differed by less than ten percent. Note that while USAF Medical Center Scott had a large difference between projected and observed expenses, it was not excluded from the modeling because it was a relatively small facility and exerted relatively little influence on the model results, as evidenced by the fact that the model projections for the remaining Air Force Medical Centers were accurate.

In terms of stability, the facilities that differed the most between FY88 and FY90 model predictions for FY90 model expenses were those with either the least or the greatest number of IWUs. For example, USAF

EXHIBIT 3-5: MODELED AND OBSERVED FY90 MEDICAL CENTER INPATIENT NONCLINICIAN EXPENSES

DMIS ID	NAME	INSTALLATION	FY90 OBSERVED EXPENSES	FY90 VERSION 4 IWUs	FY90 EXPENSES PROJ BY FY88 MODEL (INFLATED)	% DIFF (PROJECTED TO OBSERVED)	FY90 VERSION 8 IWUs	FY90 EXPENSES PROJ BY FY90 MODEL	% DIFF (PROJECTED TO OBSERVED)	% DIFF BETWEEN FY88 & FY90 MODEL PROJECTIONS
22	Letterman AMC	Presidio of S. F.	$46,616	19,603	$40,981	-12%	19,478	$41,414	-11%	1%
31	Fitzsimmons AMC	Denver	$64,900	28,752	$71,967	11%	27,290	$63,692	-2%	-11%
37	Walter Reed AMC	Washington	$114,972	49,004	$135,690	18%	46,498	$109,880	-4%	-19%
47	Eisenhower AMC	Ft. Gordon	$49,114	21,810	$51,650	5%	21,691	$50,722	3%	-2%
52	Tripler AMC	Ft. Shafter	$81,357	28,183	$69,860	-14%	28,782	$66,085	-19%	-5%
108	William Beaumont AMC	Ft. Bliss	$54,885	22,074	$52,845	-4%	22,169	$52,149	-5%	-1%
109	Brooke AMC	Ft. Sam Houston	$75,892	32,025	$86,675	14%	32,791	$80,176	6%	-7%
125	Madigan AMC	Ft. Lewis	$55,793	26,863	$71,669	28%	26,132	$65,717	18%	-8%
	ARMY MEDICAL CENTER TOTALS		**$543,529**	**228,315**	**$581,336**	**7%**	**224,832**	**$529,836**	**-3%**	**-9%**
27	NH Oakland	Oakland	$46,737	13,502	$35,569	-24%	13,246	$42,525	-9%	20%
29	NH San Diego	San Diego	$83,327	33,589	$92,690	11%	35,527	$91,944	10%	-1%
67	NH Bethesda	Bethesda	$44,953	24,585	$67,271	50%	25,341	$69,448	54%	3%
124	NH Portsmouth	Portsmouth	$82,073	30,063	$76,362	-7%	32,457	$78,662	-4%	3%
	NAVY MEDICAL CENTER TOTALS		**$257,090**	**101,738**	**$271,892**	**6%**	**106,572**	**$282,580**	**10%**	**4%**
14	David Grant USAF Med Ctr	Travis AFB	$43,002	15,218	$39,419	-8%	15,252	$42,469	-1%	8%
55	USAF Med Ctr Scott	Scott AFB	$19,732	8,279	$17,568	-11%	7,967	$24,643	25%	40%
66	Malcom Grow USAF Med Ctr	Andrews AFB	$31,064	11,737	$26,277	-15%	11,061	$30,113	-3%	15%
73	USAF Med Ctr Keesler	Keesler AFB	$46,892	17,717	$44,582	-5%	17,404	$44,919	-4%	1%
95	USAF Med Ctr Wright-Patterson	Wright-Patterson AFB	$43,508	13,824	$36,000	-17%	13,659	$39,789	-9%	11%
117	Wilford Hall USAF Med Ctr	Lackland AFB	$107,186	44,277	$127,105	19%	44,980	$108,258	1%	-15%
	AIR FORCE MEDICAL CENTER TOTALS		**$291,383**	**111,053**	**$290,952**	**0%**	**110,323**	**$290,192**	**0%**	**0%**

Source: FY90 Medical Expense and Performance Reporting System (MEPRS) expenses reported by the Defense Medical Information System (DMIS). Dollars stated in thousands.

Medical Center Scott, the medical center with the fewest FY90 IWUs, had predicted FY90 model predicted expenses 40% greater than FY88 model predicted expenses. NH Oakland, the smallest Navy medical center in terms of IWUs, had FY90 model predicted expenses 20% greater than FY88 model predicted expenses. This result is not surprising, due to the fact that the FY90 model intercept was much larger than that for the FY88 model, while the IWU marginal cost coefficient was much smaller. At relatively low levels of IWUs, the difference in the FY88 and FY90 intercept terms causes a large difference in the projected level of expenses. For the largest facilities in each Service, the intercept term differences play a smaller role in determining the relative size of the projected budgets, while the IWU marginal cost coefficient plays a larger role. As the exhibit demonstrates, the largest facilities have expenses predicted by the FY90 models lower than expenses predicted by the FY88 models; Walter Reed AMC's FY90 model expenses were 19% lower than the FY88 model predicted, and Wilford Hall USAF Medical Center expenses predicted by the FY90 model were 15% less than those predicted by the FY88 model. In general, and especially for facilities not at the extremes in terms of IWUs, model stability appears very high; eight of 18 medical centers had FY90 model predicted inpatient nonclinician expenses within five percent of those predicted by the FY88 model, and eleven had differences of less than ten percent. Furthermore, of the two facilities that had differences of greater than 25% between FY88 model projections of FY90 expenses and actual FY90 expenses, one (NH Bethesda) had a similar difference between FY90 model projections and observed FY90 expenses. The other, Madigan AMC, had a difference between modeled and actual expenses that dropped from 28% for the FY88 model to 18% for the FY90 model.

Inpatient Clinician Salaries

Exhibit 3-6 displays actual and projected FY90 inpatient clinician salaries. As noted in Chapter 2.0, NH Bethesda (DMIS ID 64) was excluded from the FY90 modeling prior to estimating model parameters. As the exhibit demonstrates, the inpatient clinician salary models are less adept at predicting actual expenses than the inpatient nonclinician expense models. Four facilities had significant differences between the FY90 model projections and actual FY90 expenses:

- Eisenhower AMC (DMIS ID 47) was overestimated by 48%;
- Brooke AMC (DMIS ID 109) was overestimated by 29%;
- NH Bethesda (DMIS ID 67) was underestimated 53%; and
- David Grant USAF Medical Center (DMISID 14) underestimated 26%.

Only five medical centers had differences of less than ten percent between the FY90 model projections and observed budgets. As noted previously, while the exhibit shows that NH Bethesda's inpatient clinician expenses were significantly underestimated by the model, inpatient nonclinician expenses were significantly overestimated.

In analyzing stability, note that of the four MTFs mentioned above, two also had differences between the FY88 model projections and actual FY90 expenses of more than 25%, while four additional facilities had similarly large differences in these figures. Furthermore, only two medical centers of 18 had differences between FY88 and FY90 model projections of less than ten percent. Because clinician salaries are a small component of total inpatient expenses (generally about five percent), the fact that these expenses are not accurately estimated has little influence on the accuracy of the estimate of total expenses.

EXHIBIT 3-6: MODELED AND OBSERVED FY90 MEDICAL CENTER INPATIENT CLINICIAN SALARIES

DMIS ID	NAME	INSTALLATION	FY90 OBSERVED EXPENSES	FY90 VERSION 4 IWUs	FY90 EXPENSES PROJ BY FY88 MODEL (INFLATED)	% DIFF (PROJECTED TO OBSERVED)	FY90 VERSION 8 IWUs	FY90 EXPENSES PROJ BY FY90 MODEL	% DIFF (PROJECTED TO OBSERVED)	% DIFF BETWEEN FY88 & FY90 MODEL PROJECTIONS
22	Letterman AMC	Presidio of S. F.	$3,589	19,603	$2,916	-19%	19,478	$3,305	-8%	13%
31	Fitzsimmons AMC	Denver	$5,114	28,752	$4,277	-16%	27,290	$4,630	-9%	8%
37	Walter Reed AMC	Washington	$10,181	49,004	$7,290	-28%	46,498	$7,890	-23%	8%
47	Eisenhower AMC	Ft. Gordon	$2,495	21,810	$3,244	30%	21,691	$3,680	48%	13%
52	Tripler AMC	Ft. Shafter	$4,275	28,183	$4,193	-2%	28,782	$4,884	14%	16%
108	William Beaumont AMC	Ft. Bliss	$4,242	22,074	$3,284	-23%	22,169	$3,762	-11%	15%
109	Brooke AMC	Ft. Sam Houston	$4,310	32,025	$4,764	11%	32,791	$5,564	29%	17%
125	Madigan AMC	Ft. Lewis	$3,942	26,863	$3,996	1%	26,132	$4,434	12%	11%
	ARMY MEDICAL CENTER TOTALS		**$38,149**	**228,315**	**$33,964**	**-11%**	**224,832**	**$38,149**	**0%**	**12%**
27	NH Oakland	Oakland	$1,810	13,502	$2,724	50%	13,246	$2,168	20%	-20%
29	NH San Diego	San Diego	$6,354	33,589	$6,776	7%	35,527	$5,815	-8%	-14%
67	NH Bethesda	Bethesda	$8,808	24,585	$4,959	-44%	25,341	$4,148	-53%	-16%
124	NH Portsmouth	Portsmouth	$5,132	30,063	$6,064	18%	32,457	$5,313	4%	-12%
	NAVY MEDICAL CENTER TOTALS		**$22,104**	**101,738**	**$20,523**	**-7%**	**106,572**	**$17,444**	**-21%**	**-15%**
14	David Grant USAF Med Ctr	Travis AFB	$2,800	15,218	$2,361	-16%	15,252	$2,062	-26%	-13%
55	USAF Med Ctr Scott	Scott AFB	$1,270	8,279	$1,284	1%	7,967	$1,077	-15%	-16%
66	Malcom Grow USAF Med Ctr	Andrews AFB	$1,240	11,737	$1,821	47%	11,061	$1,495	21%	-18%
73	USAF Med Ctr Keesler	Keesler AFB	$2,384	17,717	$2,748	15%	17,404	$2,353	-1%	-14%
95	USAF Med Ctr Wright-Patterson	Wright-Patterson AFB	$2,135	13,824	$2,144	0%	13,659	$1,846	-14%	-14%
117	Wilford Hall USAF Med Ctr	Lackland AFB	$5,085	44,277	$6,868	35%	44,980	$6,080	20%	-11%
	AIR FORCE MEDICAL CENTER TOTALS		**$14,913**	**111,053**	**$17,226**	**16%**	**110,323**	**$14,913**	**0%**	**-13%**

Source: FY90 Medical Expense and Performance Reporting System (MEPRS) expenses reported by the Defense Medical Information System (DMIS). Expenses stated in thousands.

Ambulatory Expenses

Walter Reed AMC was excluded from the FY90 ambulatory expense modeling prior to estimating final medical center parameters. Observed FY90 expenses and FY90 expenses predicted by FY88 and FY90 models are presented in exhibit 3-7. No FY90 (or FY88) model predicted expenses differed from actual FY90 expenses by more than 25%. All Navy facilities, and all Air Force facilities except for USAF Medical Center Scott had FY90 model predicted expenses within ten percent of actual FY90 expenses. Four of the eight Army medical centers had predicted and observed expenses within ten percent of each other.

All Army and Navy medical centers had FY88 model predicted expenses within five percent of FY90 model predicted expenses. The Air Force models demonstrated somewhat less stability, with five of the six facilities having the two predicted budgets varying by between eight and twelve percent. The FY90 model predicted expenses for the sixth facility, Wilford Hall USAF Medical Center (DMIS ID 117), were 20% greater than the FY88 model predicted expenses.

3.2 CONUS COMMUNITY HOSPITALS

This section provides a detailed presentation of estimates obtained from CONUS community hospital models. Inpatient nonclinician expenses, inpatient clinician salaries, and ambulatory expenses are discussed separately.

Inpatient Nonclinician Expenses

FY90 observed and predicted inpatient nonclinician expenses are presented in exhibit 3-8. Womack AH (DMISID 89) was excluded from the modeling prior to final parameter estimation. Out of 29 Army CONUS community hospitals, one MTF, Bassett ACH -- Ft. Wainwright, had FY90

EXHIBIT 3-7: MODELED AND OBSERVED FY90 MEDICAL CENTER AMBULATORY EXPENSES

DMIS ID	NAME	INSTALLATION	FY90 OBSERVED EXPENSES	FY90 AWUs	FY90 EXPENSES PROJ BY FY88 MODEL (INFLATED)	% DIFF (PROJECTED TO OBSERVED)	FY90 EXPENSES PROJ BY FY90 MODEL	% DIFF (PROJECTED TO OBSERVED)	% DIFF BETWEEN FY88 & FY90 MODEL PROJECTIONS
22	Letterman AMC	Presidio of S. F.	$34,675	12,250	$33,943	-2%	$32,626	-6%	-4%
31	Fitzsimmons AMC	Denver	$40,979	18,225	$44,649	9%	$44,472	9%	0%
37	Walter Reed AMC	Washington	$82,133	28,651	$63,331	-23%	$65,142	-21%	3%
47	Eisenhower AMC	Ft. Gordon	$46,108	15,001	$38,872	-16%	$38,080	-17%	-2%
52	Tripler AMC	Ft. Shafter	$57,870	22,037	$51,479	-11%	$52,029	-10%	1%
108	William Beaumont AMC	Ft. Bliss	$41,061	19,194	$46,385	13%	$46,393	13%	0%
109	Brooke AMC	Ft. Sam Houston	$54,532	22,757	$52,771	-3%	$53,458	-2%	1%
125	Madigan AMC	Ft. Lewis	$47,352	24,177	$55,314	17%	$56,272	19%	2%
	ARMY MEDICAL CENTER TOTALS		**$404,711**	**162,292**	**$386,744**	**-4%**	**$388,472**	**-4%**	**0%**
27	NH Oakland	Oakland	$44,783	12,189	$42,996	-4%	$41,781	-7%	-3%
29	NH San Diego	San Diego	$87,242	28,124	$79,282	-9%	$82,390	-6%	4%
67	NH Bethesda	Bethesda	$47,015	15,265	$50,000	6%	$49,620	6%	-1%
124	NH Portsmouth	Portsmouth	$76,436	27,934	$78,849	3%	$81,906	7%	4%
	NAVY MEDICAL CENTER TOTALS		**$255,476**	**83,513**	**$251,126**	**-2%**	**$255,698**	**0%**	**2%**
14	David Grant USAF Med Ctr	Travis AFB	$29,558	9,489	$26,383	-11%	$29,016	-2%	10%
55	USAF Med Ctr Scott	Scott AFB	$21,461	8,094	$24,109	12%	$26,060	21%	8%
66	Malcom Grow USAF Med Ctr	Andrews AFB	$34,908	11,602	$29,829	-15%	$33,493	-4%	12%
73	USAF Med Ctr Keesler	Keesler AFB	$30,590	10,879	$28,649	-6%	$31,961	4%	12%
95	USAF Med Ctr Wright-Patterson	Wright-Patterson AFB	$35,117	11,414	$29,522	-16%	$33,095	-6%	12%
117	Wilford Hall USAF Med Ctr	Lackland AFB	$69,429	27,167	$55,205	-20%	$66,468	-4%	20%
	AIR FORCE MEDICAL CENTER TOTALS		**$221,063**	**78,645**	**$193,696**	**-12%**	**$220,093**	**0%**	**14%**

Source: FY90 Medical Expense and Performance Reporting System (MEPRS) expenses reported by the Defense Medical Information System (DMIS). Expenses stated in thousands.

EXHIBIT 3-8: MODELED AND OBSERVED FY90 CONUS COMMUNITY HOSPITAL INPATIENT NONCLINICIAN EXPENSES

DMIS ID	NAME	INSTALLATION	FY90 OBSERVED EXPENSES	FY90 VERSION 4 IWUs	FY90 EXPENSES PROJ BY FY88 MODEL (INFLATED)	% DIFF (PROJECTED TO OBSERVED)	FY90 VERSION 8 IWUs	FY90 EXPENSES PROJ BY FY90 MODEL	% DIFF (PROJECTED TO OBSERVED)	% DIFF BETWEEN FY88 & FY90 MODEL PROJECTIONS
1	Fox AH	Redstone Arsenal	$5,039	2,129	$4,780	-5%	2,057	$4,780	-5%	0%
2	Noble AH	Ft. McClellan	$7,334	3,947	$8,248	12%	3,720	$7,973	9%	-3%
3	Lyster AH	Ft. Rucker	$7,568	3,769	$7,908	4%	3,633	$7,806	3%	-1%
5	Bassett ACH	Ft. Wainwright	$9,179	2,930	$6,308	-31%	2,866	$6,335	-31%	0%
8	Bliss AH	Ft. Huachuca	$7,178	3,378	$7,164	0%	3,313	$7,192	0%	0%
23	Hays AH	Ft. Ord	$18,523	9,008	$17,903	-3%	8,780	$17,690	-4%	-1%
32	Evans AH	Ft. Carson	$19,903	9,207	$18,282	-8%	8,741	$17,614	-11%	-4%
48	Martin AH	Ft. Benning	$23,172	12,840	$25,211	9%	12,427	$24,694	7%	-2%
49	Winn AH	Ft. Stewart	$13,865	5,418	$11,055	-20%	5,296	$10,999	-21%	-1%
57	Irwin AH	Ft. Riley	$13,103	6,124	$12,401	-5%	6,092	$12,529	-4%	1%
58	Munson AH	Ft. Leavenworth	$6,071	1,931	$4,402	-27%	1,961	$4,596	-24%	4%
60	Blanchfield ACH	Ft. Campbell	$18,044	9,757	$19,332	7%	9,731	$19,516	8%	1%
61	Ireland AH	Ft. Knox	$16,662	8,149	$16,263	-2%	7,850	$15,904	-5%	-2%
64	Bayne-Jones AH	Ft. Polk	$13,522	5,589	$11,380	-16%	5,610	$11,602	-14%	2%
69	Kimbrough AH	Ft. Meade	$7,575	4,688	$9,662	28%	4,552	$9,572	26%	-1%
70	Cutler AH	Ft. Devens	$4,660	2,312	$5,130	10%	2,378	$5,398	16%	5%
75	Wood AH	Ft. Leonard Wood	$16,950	8,744	$17,398	3%	8,380	$16,922	0%	-3%
81	Patterson AH	Ft. Monmouth	$4,100	1,398	$3,386	-17%	1,392	$3,503	-15%	3%
82	Walson AH	Ft. Dix	$12,413	4,565	$9,428	-24%	4,590	$9,645	-22%	2%
86	Keller AH	West Point	$7,125	4,074	$8,490	19%	4,078	$8,660	22%	2%
89	Womack AH	Ft. Bragg	$23,049	16,361	$31,928	39%	16,513	$32,538	41%	2%
98	Reynolds AH	Ft. Sill	$14,335	8,109	$16,188	13%	7,788	$15,785	10%	-2%
105	Moncrief AH	Ft. Jackson	$14,510	8,656	$17,231	19%	9,064	$18,235	26%	6%
110	Darnall AH	Ft. Hood	$26,330	14,646	$28,657	9%	14,855	$29,356	11%	2%
121	McDonald AH	Ft. Eustis	$6,624	3,488	$7,373	11%	3,534	$7,616	15%	3%
122	Kenner AH	Ft. Lee	$6,505	4,077	$8,497	31%	4,129	$8,759	35%	3%
123	Dewitt AH	Ft. Belvoir	$13,694	6,270	$12,679	-7%	6,093	$12,530	-9%	-1%
131	Weed ACH	Ft. Irwin	$3,736	1,215	$3,037	-19%	1,137	$3,013	-19%	-1%
294	Hawley AH	Ft. Benjamin Harrison	$2,372	945	$2,521	6%	915	$2,588	9%	3%
ARMY CONUS COMMUNITY HOSPITAL TOTALS			**$343,141**	**173,724**	**$352,244**	**3%**	**171,472**	**$353,349**	**3%**	**0%**

Source: FY90 Medical Expense and Performance Reporting System (MEPRS) expenses reported by the Defense Medical Information System (DMIS). Expenses stated in thousands.

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EXHIBIT 3-8: MODELED AND OBSERVED FY90 CONUS COMMUNITY HOSPITAL INPATIENT NONCLINICIAN EXPENSES (CONTINUED)

DMIS ID	NAME	INSTALLATION	FY90 OBSERVED EXPENSES	FY90 VERSION 4 IWUs	FY90 EXPENSES PROJ BY FY88 MODEL (INFLATED)	% DIFF (PROJECTED TO OBSERVED)	FY90 VERSION 8 IWUs	FY90 EXPENSES PROJ BY FY90 MODEL	% DIFF (PROJECTED TO OBSERVED)	% DIFF BETWEEN FY88 & FY90 MODEL PROJECTIONS
7	BRH NAVSTA Adak	Adak	$1,259	418	$1,966	56%	392	$2,003	59%	2%
24	NH Camp Pendleton	Camp Pendleton	$21,064	8,185	$21,171	1%	8,209	$20,987	0%	-1%
25	NH Long Beach	Long Beach	$14,560	4,540	$12,158	-16%	4,752	$12,591	-14%	4%
28	NH Lemoore	Lemoore	$2,909	1,148	$3,772	30%	1,042	$3,580	23%	-5%
30	NH Twenty-nine Palms	Twenty-nine Palms	$3,347	1,424	$4,454	33%	1,388	$4,423	32%	-1%
35	NH Groton	Groton	$6,422	1,753	$5,268	-18%	1,838	$5,514	-14%	5%
38	NH Pensacola	Pensacola	$17,905	6,338	$16,604	-7%	6,282	$16,308	-9%	-2%
39	NH Jacksonville	Jacksonville	$25,920	8,974	$23,121	-11%	10,092	$25,560	-1%	11%
40	NH Orlando	Orlando	$13,793	5,424	$14,344	4%	6,255	$16,243	18%	13%
56	NH Great Lakes	Great Lakes	$15,978	4,633	$12,389	-22%	5,026	$13,258	-17%	7%
68	NH Patuxent River	Patuxent River	$3,507	761	$2,815	-20%	719	$2,797	-20%	-1%
91	NH Camp Lejeune	Camp Lejeune	$18,322	7,939	$20,563	12%	8,309	$21,232	16%	3%
92	NH Cherry Point	Cherry Point	$2,587	1,737	$5,228	102%	1,658	$5,078	96%	-3%
99	NH Philadelphia	Philadelphia	$6,424	1,832	$5,462	-15%	2,084	$6,111	-5%	12%
100	NH Newport	Newport	$7,510	2,337	$6,710	-11%	2,548	$7,239	-4%	8%
103	NH Charleston	Charleston	$20,562	9,176	$23,621	15%	9,636	$24,452	19%	4%
104	NH Beaufort	Beaufort	$7,006	2,271	$6,547	-7%	2,193	$6,377	-9%	-3%
107	NH Millington	Millington	$9,529	2,504	$7,124	-25%	2,881	$8,047	-16%	13%
118	NH Corpus Christi	Corpus Christi	$6,563	1,959	$5,776	-12%	1,884	$5,625	-14%	-3%
126	NH Bremerton	Bremerton	$14,859	4,270	$11,490	-23%	4,462	$11,886	-20%	3%
127	NH Oak Harbor	Oak Harbor	$3,944	1,275	$4,084	4%	1,277	$4,153	5%	2%
NAVY CONUS COMMUNITY HOSPITAL TOTALS			**$223,971**	**78,898**	**$214,667**	**-4%**	**82,926**	**$223,465**	**0%**	**4%**

Source: FY90 Medical Expense and Performance Reporting System (MEPRS) expenses reported by the Defense Medical Information System (DMIS). Expenses stated in thousands.

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EXHIBIT 3-8: MODELED AND OBSERVED FY90 CONUS COMMUNITY HOSPITAL INPATIENT NONCLINICIAN EXPENSES (CONTINUED)

DMISID	NAME	INSTALLATION	FY90 OBSERVED EXPENSES	FY90 VERSION 4 IWUs	FY90 EXPENSES PROJ BY FY88 MODEL (INFLATED)	% DIFF (PROJECTED TO OBSERVED)	FY90 VERSION 8 IWUs	FY90 EXPENSES PROJ BY FY90 MODEL	% DIFF (PROJECTED TO OBSERVED)	% DIFF BETWEEN FY88 & FY90 MODEL PROJECTIONS
4	Air University Rgn Hospital	Maxwell AFB	$5,527	3,682	$7,922	43%	3,570	$8,245	49%	4%
6	USAF Hospital Elmendorf	Elmendorf AFB	$14,180	4,830	$10,165	-28%	4,784	$10,747	-24%	6%
9	832nd Medical Group	Luke AFB	$7,721	3,127	$6,840	-11%	3,106	$7,290	-6%	7%
10	836th Medical Group	Davis Monthan AFB	$6,906	2,722	$6,050	-12%	2,625	$6,298	-9%	4%
11	USAF Hospital Williams	Williams AFB	$3,720	908	$2,509	-33%	858	$2,658	-29%	6%
12	97th Strategic Hospital	Eaker AFB	$2,835	750	$2,200	-22%	743	$2,421	-15%	10%
13	USAF Hospital Little Rock	Little Rock AFB	$4,031	1,707	$4,067	1%	1,691	$4,374	9%	8%
15	9th Strategic Hospital	Beale AFB	$3,414	1,269	$3,214	-6%	1,237	$3,440	1%	7%
16	USAF Hospital Mather	Mather AFB	$7,949	2,923	$6,441	-19%	2,650	$6,350	-20%	-1%
17	93rd Strategic Hospital	Castle AFB	$3,003	1,388	$3,446	15%	1,346	$3,664	22%	6%
18	1st Strategic Hospital	Vandenberg AFB	$4,903	1,583	$3,825	-22%	1,604	$4,196	-14%	10%
19	USAF Hospital Edwards	Edwards AFB	$3,425	1,275	$3,224	-6%	1,200	$3,363	-2%	4%
20	831st Medical Group	George AFB	$3,540	1,460	$3,587	1%	1,505	$3,991	13%	11%
21	22nd Strategic Hospital	March AFB	$11,992	3,476	$7,521	-37%	3,556	$8,217	-31%	9%
33	USAF Academy Hospital	USAF Academy	$10,406	4,203	$8,940	-14%	4,184	$9,510	-9%	6%
36	USAF Hospital Dover	Dover AFB	$2,995	1,317	$3,306	10%	1,338	$3,648	22%	10%
42	USAF Rgn Hospital Eglin	Eglin AFB	$17,856	8,423	$17,178	-4%	8,565	$18,535	4%	8%
43	325th Medical Group	Tyndall AFB	$5,901	2,081	$4,798	-19%	1,930	$4,866	-18%	1%
44	31st Medical Group	Homestead AFB	$6,987	2,312	$5,249	-25%	2,191	$5,404	-23%	3%
45	56th Medical Group	Macdill AFB	$9,748	4,097	$8,734	-10%	3,953	$9,035	-7%	3%
46	USAF Hospital Patrick	Patrick AFB	$1,947	874	$2,442	25%	848	$2,637	35%	8%
50	347th Medical Group	Moody AFB	$3,689	1,227	$3,130	-15%	1,177	$3,315	-10%	6%
51	USAF Hospital Robins	Robins AFB	$3,741	1,355	$3,381	-10%	1,265	$3,498	-6%	3%
53	366th Medical Group	Mountain Home AFB	$3,317	1,478	$3,621	9%	1,489	$3,958	19%	9%
54	USAF Hospital Chanute	Chanute AFB	$2,599	1,079	$2,842	9%	1,094	$3,144	21%	11%
59	384th Strategic Hospital	McConnell AFB	$1,778	458	$1,630	-8%	454	$1,827	3%	12%
62	2nd Strategic Hospital	Barksdale AFB	$6,531	2,971	$6,536	0%	2,842	$6,747	3%	3%
63	23rd Medical Group	England AFB	$2,840	938	$2,567	-10%	888	$2,721	-4%	6%
65	42nd Strategic Hospital	Loring AFB	$2,680	1,073	$2,830	6%	1,085	$3,126	17%	10%
71	379th Strategic Hospital	Wurtsmith AFB	$3,114	1,266	$3,207	3%	1,251	$3,469	11%	8%
72	410th Strategic Hospital	K.I.Sawyer AFB	$3,074	968	$2,625	-15%	940	$2,827	-8%	8%

Source: FY90 Medical Expense and Performance Reporting System (MEPRS) expenses reported by the Defense Medical Information System (DMIS). Expenses stated in thousands.

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EXHIBIT 3-8: MODELED AND OBSERVED FY90 CONUS COMMUNITY HOSPITAL INPATIENT NONCLINICIAN EXPENSES (CONCLUDED)

DMIS ID	NAME	INSTALLATION	FY90 OBSERVED EXPENSES	FY90 VERSION 4 IWUs	FY90 EXPENSES PROJ BY FY88 MODEL (INFLATED)	% DIFF (PROJECTED TO OBSERVED)	FY90 VERSION 8 IWUs	FY90 EXPENSES PROJ BY FY90 MODEL	% DIFF (PROJECTED TO OBSERVED)	% DIFF BETWEEN FY88 & FY90 MODEL PROJECTIONS
74	USAF Hospital Columbus	Columbus AFB	$2,074	644	$1,994	-4%	623	$2,175	5%	9%
76	351st Strategic Hospital	Whiteman AFB	$3,209	1,406	$3,481	8%	1,401	$3,778	18%	9%
78	Ehrling Berquist Rgn Hosp	Offutt AFB	$3,372	4,568	$9,652	15%	4,573	$10,311	23%	7%
79	554th Medical Group	Nellis AFB	$5,093	2,511	$5,638	11%	2,476	$5,992	18%	6%
80	509th Strategic Hospital	Pease AFB	$4,264	1,652	$3,960	-7%	1,629	$4,248	0%	7%
83	USAF Hospital Kirtland	Kirtland AFB	$4,437	2,613	$5,837	32%	2,685	$6,422	45%	10%
84	833rd Medical Group	Holloman AFB	$3,507	1,255	$3,187	-9%	1,257	$3,275	-7%	3%
85	27th Medical Group	Cannon AFB	$3,967	1,420	$3,508	-12%	1,442	$3,863	-3%	10%
87	380th Strategic Hospital	Plattsburgh AFB	$1,585	472	$1,657	5%	493	$1,906	20%	15%
88	416th Strategic Hospital	Griffiss AFB	$3,406	1,072	$2,828	-17%	1,036	$3,025	-11%	7%
90	4th Medical Group	Seymour Johnson AFB	$2,892	1,111	$2,906	0%	1,058	$3,070	6%	6%
93	842nd Strategic Hospital	Grand Forks AFB	$3,343	1,465	$3,596	8%	1,478	$3,937	18%	9%
94	857th Strategic Hospital	Minot AFB	$5,115	2,219	$5,068	-1%	2,122	$5,263	3%	4%
96	USAF Hospital Tinker	Tinker AFB	$2,921	2,485	$5,586	91%	2,486	$6,012	106%	8%
97	USAF Hospital Altus	Altus AFB	$3,420	1,073	$2,830	-17%	1,038	$3,029	-11%	7%
101	363rd Medical Group	Shaw AFB	$4,370	1,688	$4,031	-8%	1,596	$4,179	-4%	4%
102	354th Medical Group	Myrtle Beach AFB	$2,050	558	$1,826	-11%	544	$2,011	-2%	10%
106	44th Strategic Hospital	Ellsworth AFB	$4,533	2,138	$4,910	8%	2,137	$5,294	17%	8%
111	USAF Hospital Reese	Reese AFB	$1,704	296	$1,314	-23%	305	$1,520	-11%	16%
112	96th Strategic Hospital	Dyess AFB	$4,250	1,806	$4,261	0%	1,689	$4,370	3%	3%
113	USAF Rgn Hospital Sheppard	Sheppard AFB	$13,267	4,932	$10,362	-22%	5,166	$11,534	-13%	11%
114	USAF Hospital Laughlin	Laughlin AFB	$2,744	526	$1,763	-36%	521	$1,964	-28%	11%
115	67th Medical Group	Bergstrom AFB	$3,081	1,451	$3,568	16%	1,445	$3,868	26%	8%
116	Robert Thompson Strategic Hosp	Carswell AFB	$15,477	7,398	$15,177	-2%	7,155	$15,631	1%	3%
119	USAF Hospital Hill	Hill AFB	$4,071	1,933	$4,509	11%	1,905	$4,816	18%	7%
120	1st Medical Group	Langley AFB	$7,944	2,799	$6,199	-22%	2,669	$6,390	-20%	3%
128	92nd Strategic Hospital	Fairchild AFB	$5,994	3,037	$6,664	11%	2,913	$6,892	15%	3%
129	90th Strategic Hospital	F.E. Warren AFB	$2,898	1,542	$3,746	29%	1,492	$3,964	37%	6%
AIR FORCE CONUS COMMUNITY HOSPITAL TOTALS			**$302,336**	**123,289**	**$284,082**	**-6%**	**121,200**	**$302,262**	**0%**	**6%**

Source: FY90 Medical Expense and Performance Reporting System (MEPRS) expenses reported by the Defense Medical Information System (DMIS). Expenses stated in thousands.

model predicted expenses greater than 25% less than observed FY90 expenses. Four Army MTFs had FY90 model predicted expenses greater than 25% more than observed FY90 expenses:

- Kimbrough AH -- Ft. Meade (DMIS ID 69): 26%;
- Womack AH -- Ft. Bragg (DMIS ID 89): 41%;
- Moncrief AH -- Ft. Jackson (DMIS ID 105): 26%; and
- Kenner AH -- Ft. Lee (DMIS ID 122): 35%.

Thirteen Army MTFs had FY90 model predicted inpatient nonclinician expenses within ten percent of observed FY90 expenses. In examining stability, the FY90 model predicted inpatient nonclinician expenses for all Army MTFs within six percent of FY88 model predictions. Of the five Army facilities noted above for greater than 25% differences between FY90 model predicted and observed expenses, all but Moncrief also had greater than 25% differences between FY88 model predicted and observed expenses (Moncrief had a 19% difference). One other Army MTF had a greater than 25% difference between FY88 model predicted and FY90 observed expenses: Munson AH -- Ft. Leavenworth (Munson had a 24% difference between FY90 model predicted and FY90 observed expenses). The Army inpatient clinician expense models appear to be fairly accurate, and very stable.

Three of 21 Navy facilities had FY90 model predicted inpatient nonclinician expenses overestimating FY90 observed expenses by greater than 25%:

- BRH NAVSTA Adak (DMISID 7): 59%;
- NH Twenty-nine Palms (DMISID 30): 32%; and
- NH Cherry Point (DMISID 92): 96%.

Interestingly, while NH Cherry Point's inpatient nonclinician expenses were considerably overestimated, its inpatient clinician expenses were

considerably underestimated, suggesting a difference between how NH Cherry Point and other CONUS community hospitals determine the portion of inpatient expenses attributable to inpatient clinician salaries. Indeed, an examination of the FY90 MEPRS expense data reveal that while all other Navy CONUS community hospitals have a ratio of inpatient non-clinician expenses to total inpatient expenses of over 90%, the ratio for NH Cherry Point was 47%. One third of the Navy facilities had FY90 model predicted expenses within ten percent of observed expenses.

In examining stability, fifteen MTFs had differences between FY88 and FY90 model predicted expenses of less than five percent. All Navy MTFs had FY90 model predicted expenses within 13% of FY88 model predicted expenses. Examination of the facilities with the greatest differences between FY88 model and FY90 model predicted expenses revealed that the level of difference in the predicted expenses was directly related to the level of difference in IWUs caused by using the Version 8 workload (employed in FY90 model predictions) rather than the Version 4 workload (employed in the FY88 model predictions).

Finally, note that all Navy facilities having greater than a 25% difference between FY90 model predicted expenses and FY90 observed expenses also had significant differences between FY88 model predicted expenses and observed FY90 expenses. There was one additional Navy facility which had a greater than 25% difference between FY88 model predicted expenses and FY90 observed expenses: NH Lemoore (DMIS ID 28), which had a 30% difference between FY88 model predicted expenses and FY90 observed expenses, and a 23% difference between FY90 model predicted expenses and FY90 actual expenses. In considering these statistics, while more accuracy would be desirable for the Navy models, they appear to be very stable.

Nine of 59 Air Force CONUS community hospitals had FY90 model predicted inpatient nonclinician expenses that varied by more than 25% from FY90 observed expenses:

- Air Force University Regional Hospital -- Maxwell AFB (DMIS ID 4): overestimated by 49%;
- USAF Hospital Williams -- Williams AFB (DMIS ID 11): underestimated by 29%;
- 22nd Strategic Hospital -- March AFB (DMIS ID 21): -31%;
- USAF Hospital Patrick -- Patrick AFB (DMIS ID 46): 35%;
- USAF Hospital Kirtland -- Kirtland AFB (DMIS ID 83): 45%;
- USAF Hospital Tinker -- Tinker AFB (DMIS ID 96): 106%;
- USAF Hospital Laughlin -- Laughlin AFB (DMIS ID 114): -28%;
- 67th Medical Group -- Bergstrom AFB (DMIS ID 115): 26%; and
- 90th Strategic Hospital -- F.E. Warren AFB (DMIS ID 129): 37%.

Twenty-four Air Force MTFs had differences within ten percent. As far as stability is concerned, 16 MTFs had FY90 model predicted expenses within five percent of FY88 model predicted expenses, and 52 had FY88 and FY90 model predicted expenses within ten percent of each other. Of the nine facilities with significant differences between observed and FY90 model predicted expenses, seven also had significant differences between FY88 model predicted expenses and FY90 observed expenses. USAF Hospital Patrick's FY88 model predicted inpatient nonclinician expenses were 25% greater than observed expenses, and the 67th Medical Group's FY88 model predicted expenses were 16% greater than FY90 actual expenses. One additional MTF had a significant difference between FY88 model projected inpatient nonclinician expenses and FY90 observed expenses: USAF Hospital Elmendorf (DMIS ID 6), which had FY88 model projected expenses 28% less than observed FY90 expenses, and FY90 model projected expenses 24% less. FY90 Air Force inpatient nonclinician expense appear fairly accurate and stable.

Inpatient Clinician Salaries

FY90 predicted and observed CONUS community hospital inpatient clinician salaries are presented in exhibit 3-9. As noted in chapter 2.0, NH Cherry Point was excluded from FY90 modeling prior to final parameter estimation.

Thirty-seven CONUS community hospitals out of 109 had FY90 model predicted inpatient clinician salaries varying by more than 25% from FY90 actual expenses. The Navy had the most variation, with ten out of 21 MTFs having significant differences. The Army (nine out of 29 MTFs) and the Air Force (18 out of 59 MTFs) had virtually equal proportions of facilities with significant differences. Thirty MTFs had differences of less than ten percent. Twenty-one of these were from the Air Force, five from the Army, and four from the Navy. In terms of stability, 39 MTFs had FY88 model predictions more than 25% different from FY90 observed values. Twenty-nine of these MTFs were also among those with significant differences between FY90 model predicted and observed expenses. No Army facilities had FY90 model predictions varying by more than five percent from FY88 model predictions. Ten Navy MTFs had FY90 model predictions varying from FY88 model predictions by more than ten percent. Twelve Air Force MTFs varied by five percent or less, while 45 varied by within ten percent.

Because clinician salaries are a small component of total inpatient expenses (generally about five percent), the fact that these expenses are not accurately estimated has little influence on the accuracy of the estimate of total expenses. Similarly, although these models are not as stable, in general, as inpatient nonclinician (or ambulatory, as will be seen), this instability has little influence on the stability of total predicted expenses.

EXHIBIT 3-9: MODELED AND OBSERVED FY90 CONUS COMMUNITY HOSPITAL INPATIENT CLINICIAN SALARIES

DMIS ID	NAME	INSTALLATION	FY90 OBSERVED EXPENSES	FY90 VERSION 4 IWUs	FY90 EXPENSES PROJ BY FY88 MODEL (INFLATED)	% DIFF (PROJECTED TO OBSERVED)	FY90 VERSION 8 IWUs	FY90 EXPENSES PROJ BY FY90 MODEL	% DIFF (PROJECTED TO OBSERVED)	% DIFF BETWEEN FY88 & FY90 MODEL PROJECTIONS
1	Fox AH	Redstone Arsenal	$307	2,129	$228	-26%	2,057	$225	-27%	-1%
2	Noble AH	Ft. McClellan	$310	3,947	$423	36%	3,720	$407	31%	-4%
3	Lyster AH	Ft. Rucker	$197	3,769	$404	105%	3,633	$398	102%	-2%
5	Bassett ACH	Ft. Wainwright	$370	2,930	$314	-15%	2,866	$314	-15%	0%
8	Bliss AH	Ft. Huachuca	$330	3,378	$362	10%	3,313	$363	10%	0%
23	Hays AH	Ft. Ord	$1,378	9,008	$966	-30%	8,780	$962	-30%	0%
32	Evans AH	Ft. Carson	$1,236	9,207	$987	-20%	8,741	$957	-23%	-3%
48	Martin AH	Ft. Benning	$1,086	12,840	$1,376	27%	12,427	$1,361	25%	-1%
49	Winn AH	Ft. Stewart	$667	5,418	$581	-13%	5,296	$580	-13%	0%
57	Irwin AH	Ft. Riley	$658	6,124	$656	0%	6,092	$667	1%	2%
58	Munson AH	Ft. Leavenworth	$155	1,931	$207	34%	1,961	$215	39%	4%
60	Blanchfield ACH	Ft. Campbell	$910	9,757	$1,046	15%	9,731	$1,066	17%	2%
61	Ireland AH	Ft. Knox	$598	8,149	$874	46%	7,850	$860	44%	-2%
64	Bayne-Jones AH	Ft. Polk	$785	5,589	$599	-24%	5,610	$614	-22%	3%
69	Kimbrough AH	Ft. Meade	$262	4,688	$503	92%	4,552	$499	91%	-1%
70	Cutler AH	Ft. Devens	$310	2,312	$248	-20%	2,378	$261	-16%	5%
75	Wood AH	Ft. Leonard Wood	$921	8,744	$937	2%	8,380	$918	0%	-2%
81	Patterson AH	Ft. Monmouth	$201	1,398	$150	-25%	1,392	$152	-24%	2%
82	Walson AH	Ft. Dix	$659	4,565	$489	-26%	4,590	$503	-24%	3%
86	Keller AH	West Point	$584	4,074	$437	-25%	4,078	$447	-24%	2%
89	Womack AH	Ft. Bragg	$1,889	16,361	$1,754	-7%	16,513	$1,809	-4%	3%
98	Reynolds AH	Ft. Sill	$955	8,109	$869	-9%	7,788	$853	-11%	-2%
105	Moncrief AH	Ft. Jackson	$725	8,656	$928	28%	9,064	$993	37%	7%
110	Darnall AH	Ft. Hood	$1,326	14,646	$1,570	18%	14,855	$1,627	23%	4%
121	McDonald AH	Ft. Eustis	$509	3,488	$374	-26%	3,534	$387	-24%	4%
122	Kenner AH	Ft. Lee	$432	4,077	$437	1%	4,129	$452	5%	3%
123	Dewitt AH	Ft. Belvoir	$810	6,270	$672	-17%	6,093	$667	-18%	-1%
131	Weed ACH	Ft. Irwin	$153	1,215	$130	-15%	1,137	$124	-18%	-4%
294	Hawley AH	Ft. Benjamin Harrison	$60	945	$101	68%	915	$100	66%	-1%
ARMY CONUS COMMUNITY HOSPITAL TOTALS			**$18,783**	**173,724**	**$18,623**	**-1%**	**171,472**	**$18,783**	**0%**	**1%**

Source: FY90 Medical Expense and Performance Reporting System (MEPRS) expenses reported by the Defense Medical Information System (DMIS). Expenses stated in thousands.

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EXHIBIT 3-9: MODELED AND OBSERVED FY90 CONUS COMMUNITY HOSPITAL INPATIENT CLINICIAN SALARIES (CONTINUED)

DMIS ID	NAME	INSTALLATION	FY90 OBSERVED EXPENSES	FY90 VERSION 4 IWUs	FY90 EXPENSES PROJ BY FY88 MODEL (INFLATED)	% DIFF (PROJECTED TO OBSERVED)	FY90 VERSION 8 IWUs	FY90 EXPENSES PROJ BY FY90 MODEL	% DIFF (PROJECTED TO OBSERVED)	% DIFF BETWEEN FY88 & FY90 MODEL PROJECTIONS
7	BRH NAVSTA Adak	Adak	$57	418	$70	23%	392	$58	3%	-17%
24	NH Camp Pendleton	Camp Pendleton	$1,493	8,185	$1,366	-9%	8,209	$1,217	-18%	-11%
25	NH Long Beach	Long Beach	$322	4,540	$758	135%	4,752	$705	118%	-7%
28	NH Lemoore	Lemoore	$304	1,148	$192	-37%	1,042	$154	-49%	-19%
30	NH Twenty-nine Palms	Twenty-nine Palms	$369	1,424	$238	-36%	1,388	$206	-44%	-13%
35	NH Groton	Groton	$410	1,753	$293	-29%	1,838	$272	-33%	-7%
38	NH Pensacola	Pensacola	$642	6,338	$1,058	65%	6,282	$931	45%	-12%
39	NH Jacksonville	Jacksonville	$1,596	8,974	$1,498	-6%	10,092	$1,496	-6%	0%
40	NH Orlando	Orlando	$1,045	5,424	$905	-13%	6,255	$927	-11%	2%
56	NH Great Lakes	Great Lakes	$523	4,633	$773	48%	5,026	$745	43%	-4%
68	NH Patuxent River	Patuxent River	$77	761	$127	64%	719	$107	38%	-16%
91	NH Camp Lejeune	Camp Lejeune	$1,396	7,939	$1,325	-5%	8,309	$1,232	-12%	-7%
92	NH Cherry Point	Cherry Point	$2,923	1,737	$290	-90%	1,658	$246	-92%	-15%
99	NH Philadelphia	Philadelphia	$246	1,832	$306	25%	2,084	$309	26%	1%
100	NH Newport	Newport	$336	2,337	$390	16%	2,548	$378	13%	-3%
103	NH Charleston	Charleston	$1,256	9,176	$1,532	22%	9,636	$1,429	14%	-7%
104	NH Beaufort	Beaufort	$309	2,271	$379	23%	2,193	$325	5%	-14%
107	NH Millington	Millington	$406	2,504	$418	3%	2,881	$427	5%	2%
118	NH Corpus Christi	Corpus Christi	$354	1,959	$327	-8%	1,884	$279	-21%	-15%
126	NH Bremerton	Bremerton	$824	4,270	$713	-14%	4,462	$662	-20%	-7%
127	NH Oak Harbor	Oak Harbor	$86	1,275	$213	147%	1,277	$189	120%	-11%
NAVY CONUS COMMUNITY HOSPITAL TOTALS			**$14,973**	**78,898**	**$13,170**	**-12%**	**82,926**	**$12,296**	**-18%**	**-7%**

Source: FY90 Medical Expense and Performance Reporting System (MEPRS) expenses reported by the Defense Medical Information System (DMIS). Expenses stated in thousands.

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EXHIBIT 3-9: MODELED AND OBSERVED FY90 CONUS COMMUNITY HOSPITAL INPATIENT CLINICIAN SALARIES (CONTINUED)

DMIS ID	NAME	INSTALLATION	FY90 OBSERVED EXPENSES	FY90 VERSION 4 IWUs	FY90 EXPENSES PROJ BY FY88 MODEL (INFLATED)	% DIFF (PROJECTED TO OBSERVED)	FY90 VERSION 8 IWUs	FY90 EXPENSES PROJ BY FY90 MODEL	% DIFF (PROJECTED TO OBSERVED)	% DIFF BETWEEN FY88 & FY90 MODEL PROJECTIONS
4	Air University Rgn Hospital	Maxwell AFB	$325	3,682	$366	13%	3,570	$391	20%	7%
6	USAF Hospital Elmendorf	Elmendorf AFB	$533	4,830	$480	-10%	4,784	$525	-2%	9%
9	832nd Medical Group	Luke AFB	$424	3,127	$311	-27%	3,106	$341	-20%	10%
10	836th Medical Group	Davis Monthan AFB	$293	2,722	$270	-8%	2,625	$288	-2%	6%
11	USAF Hospital Williams	Williams AFB	$33	908	$90	176%	858	$94	188%	4%
12	97th Strategic Hospital	Eaker AFB	$96	750	$75	-22%	743	$81	-15%	9%
13	USAF Hospital Little Rock	Little Rock AFB	$230	1,707	$170	-26%	1,691	$185	-19%	9%
15	9th Strategic Hospital	Beale AFB	$172	1,269	$126	-27%	1,237	$136	-21%	8%
16	USAF Hospital Mather	Mather AFB	$227	2,923	$290	28%	2,650	$291	28%	0%
17	93rd Strategic Hospital	Castle AFB	$125	1,388	$138	10%	1,346	$148	18%	7%
18	1st Strategic Hospital	Vandenberg AFB	$126	1,583	$157	24%	1,604	$176	39%	12%
19	USAF Hospital Edwards	Edwards AFB	$157	1,275	$127	-19%	1,200	$132	-16%	4%
20	831st Medical Group	George AFB	$170	1,460	$145	-15%	1,505	$165	-3%	14%
21	22nd Strategic Hospital	March AFB	$492	3,476	$345	-30%	3,556	$390	-21%	13%
33	USAF Academy Hospital	USAF Academy	$397	4,203	$418	5%	4,184	$459	16%	10%
36	USAF Hospital Dover	Dover AFB	$181	1,317	$131	-28%	1,338	$147	-19%	12%
42	USAF Rgn Hospital Eglin	Eglin AFB	$1,011	8,423	$837	-17%	8,565	$939	-7%	12%
43	325th Medical Group	Tyndall AFB	$235	2,081	$207	-12%	1,930	$212	-10%	2%
44	31st Medical Group	Homestead AFB	$256	2,312	$230	-10%	2,191	$240	-6%	5%
45	56th Medical Group	Macdill AFB	$508	4,097	$407	-20%	3,953	$433	-15%	6%
46	USAF Hospital Patrick	Patrick AFB	$100	874	$87	-13%	848	$93	-7%	7%
50	347th Medical Group	Moody AFB	$144	1,227	$122	-15%	1,177	$129	-10%	6%
51	USAF Hospital Robins	Robins AFB	$128	1,355	$135	6%	1,265	$139	9%	3%
53	366th Medical Group	Mountain Home AFB	$120	1,478	$147	22%	1,489	$163	36%	11%
54	USAF Hospital Chanute	Chanute AFB	$80	1,079	$107	34%	1,094	$120	49%	12%
59	384th Strategic Hospital	McConnell AFB	$37	458	$45	23%	454	$50	34%	9%
62	2nd Strategic Hospital	Barksdale AFB	$295	2,971	$295	0%	2,842	$312	6%	6%
63	23rd Medical Group	England AFB	$73	938	$93	27%	888	$97	33%	5%
65	42nd Strategic Hospital	Loring AFB	$93	1,073	$107	15%	1,085	$119	28%	12%
71	379th Strategic Hospital	Wurtsmith AFB	$124	1,266	$126	1%	1,251	$137	10%	9%
72	410th Strategic Hospital	K.I.Sawyer AFB	$133	968	$96	-28%	940	$103	-23%	7%

Source: FY90 Medical Expense and Performance Reporting System (MEPRS) expenses reported by the Defense Medical Information System (DMIS). Expenses stated in thousands.

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EXHIBIT 3-9: MODELED AND OBSERVED FY90 CONUS COMMUNITY HOSPITAL INPATIENT CLINICIAN SALARIES (CONCLUDED)

DMIS ID	NAME	INSTALLATION	FY90 OBSERVED EXPENSES	FY90 VERSION 4 WUs	FY90 EXPENSES PROJ BY FY88 MODEL (INFLATED)	% DIFF (PROJECTED TO OBSERVED)	FY90 VERSION 8 WUs	FY90 EXPENSES PROJ BY FY90 MODEL	% DIFF (PROJECTED TO OBSERVED)	% DIFF BETWEEN FY88 & FY90 MODEL PROJECTIONS
74	USAF Hospital Columbus	Columbus AFB	$34	644	$64	88%	623	$68	101%	7%
76	351st Strategic Hospital	Whiteman AFB	$147	1,406	$140	-5%	1,401	$154	5%	10%
78	Ehrling Berquist Rgn Hosp	Offutt AFB	$503	4,568	$454	-10%	4,573	$501	0%	10%
79	554th Medical Group	Nellis AFB	$202	2,511	$249	23%	2,476	$271	34%	9%
80	509th Strategic Hospital	Pease AFB	$183	1,652	$164	-10%	1,629	$179	-2%	9%
83	USAF Hospital Kirtland	Kirtland AFB	$109	2,613	$260	138%	2,685	$294	170%	13%
84	833rd Medical Group	Holloman AFB	$148	1,255	$125	-16%	1,157	$127	-14%	2%
85	27th Medical Group	Cannon AFB	$174	1,420	$141	-19%	1,442	$158	-9%	12%
87	380th Strategic Hospital	Plattsburgh AFB	$59	472	$47	-20%	493	$54	-8%	15%
88	416th Strategic Hospital	Griffiss AFB	$101	1,072	$106	5%	1,036	$114	12%	7%
90	4th Medical Group	Seymour Johnson AFB	$94	1,111	$110	18%	1,058	$116	24%	5%
93	842nd Strategic Hospital	Grand Forks AFB	$127	1,465	$146	14%	1,478	$162	27%	11%
94	857th Strategic Hospital	Minot AFB	$246	2,219	$220	-10%	2,122	$233	-5%	6%
96	USAF Hospital Tinker	Tinker AFB	$67	2,485	$247	267%	2,486	$273	305%	10%
97	USAF Hospital Altus	Altus AFB	$139	1,073	$107	-23%	1,038	$114	-18%	7%
101	363rd Medical Group	Shaw AFB	$191	1,688	$168	-12%	1,596	$175	-8%	4%
102	354th Medical Group	Myrtle Beach AFB	$38	558	$55	48%	544	$60	59%	7%
106	44th Strategic Hospital	Ellsworth AFB	$180	2,138	$212	18%	2,137	$234	30%	10%
111	USAF Hospital Reese	Reese AFB	$38	296	$29	-22%	305	$33	-12%	14%
112	96th Strategic Hospital	Dyess AFB	$160	1,806	$179	12%	1,689	$185	16%	3%
113	USAF Rgn Hospital Sheppard	Sheppard AFB	$634	4,932	$490	-23%	5,166	$566	-11%	16%
114	USAF Hospital Laughlin	Laughlin AFB	$57	526	$52	-8%	521	$57	0%	9%
115	67th Medical Group	Bergstrom AFB	$78	1,451	$144	85%	1,445	$158	104%	10%
116	Robert Thompson Strategic Hosp	Carswell AFB	$1,265	7,398	$735	-42%	7,155	$785	-38%	7%
119	USAF Hospital Hill	Hill AFB	$109	1,933	$192	77%	1,905	$209	92%	9%
120	1st Medical Group	Langley AFB	$391	2,799	$278	-29%	2,669	$293	-25%	5%
128	92nd Strategic Hospital	Fairchild AFB	$339	3,037	$302	-11%	2,913	$319	-6%	6%
129	90th Strategic Hospital	F.E. Warren AFB	$158	1,542	$153	-3%	1,492	$164	3%	7%
AIR FORCE CONUS COMMUNITY HOSPITAL TOTALS			**$13,289**	**123,289**	**$12,250**	**-8%**	**121,200**	**$13,289**	**0%**	**8%**

Source: FY90 Medical Expense and Performance Reporting System (MEPRS) expenses reported by the Defense Medical Information System (DMIS). Expenses stated in thousands.

Ambulatory Expenses

FY90 CONUS community hospital predicted and observed ambulatory expenses are displayed in exhibit 3-10. Note, workload and expense from PRIMUS/NAVCARE and Occupational Health clinics are excluded. Further note, while the IWUs used as input in the FY88 (Version 4) inpatient expenses models differed from those in the FY90 Version 8 models, the AWUs used in projecting FY90 expenses were identical in both models. While AWU weights used in calculating AWUs were modified between estimating the FY88 and FY90 models, the changes were not very significant at the MTF level. Womack AH -- Ft. Bragg (DMIS ID 89), BRH NAVSTA Adak (DMIS ID 7), and NH Long Beach (DMIS ID 25) were excluded prior to estimating final FY90 ambulatory expense model parameters, due to having a cost/workload relationship considerably different from the other CONUS community hospitals.

One Army MTF had FY90 model predicted ambulatory expenses that differed by more than 25% from observed FY90 expenses: Womack AH -- Ft. Bragg was overestimated by 30%. Thirteen of 29, Army CONUS community hospitals varied between FY90 model predicted budgets and actual FY90 expenses by less than five percent. In addition to Womack AH -- Ft. Bragg, Patterson AH -- Ft. Monmouth also had FY88 model predicted expenses that differed significantly from actual FY90 expenses. Finally, note that all Army facilities had FY88 and FY90 model predicted expenses that differed by less than five percent. The Army ambulatory expense models appear to be fairly accurate and very stable.

Nine of 21 NAVY CONUS community hospitals had differences between FY90 model predicted expenses and FY90 actual expenses of ten percent or less. Six Navy MTFs had significant differences between FY90 model predicted ambulatory expenses and actual FY90 expenses:

EXHIBIT 3-10: MODELED AND OBSERVED FY90 CONUS COMMUNITY HOSPITAL AMBULATORY EXPENSES

DMIS ID	NAME	INSTALLATION	FY90 OBSERVED EXPENSES	FY90 AWUs	FY90 EXPENSES PROJ BY FY88 MODEL (INFLATED)	% DIFF (PROJECTED TO OBSERVED)	FY90 EXPENSES PROJ BY FY90 MODEL	% DIFF (PROJECTED TO OBSERVED)	% DIFF BETWEEN FY88 & FY90 MODEL PROJECTIONS
1	Fox AH	Redstone Arsenal	$8,991	3,879	$8,693	-3%	$9,057	1%	4%
2	Noble AH	Ft. McClellan	$12,251	4,808	$10,535	-14%	$10,950	-11%	4%
3	Lyster AH	Ft. Rucker	$13,369	5,509	$11,927	-11%	$12,380	-7%	4%
5	Bassett ACH	Ft. Wainwright	$13,729	5,166	$11,246	-18%	$11,680	-15%	4%
8	Bliss AH	Ft. Huachuca	$10,899	4,943	$10,804	-1%	$11,226	3%	4%
23	Hays AH	Ft. Ord	$23,949	10,957	$22,735	-5%	$23,490	-2%	3%
32	Evans AH	Ft. Carson	$29,593	13,155	$27,098	-8%	$27,974	-5%	3%
48	Martin AH	Ft. Benning	$29,875	14,513	$29,791	0%	$30,742	3%	3%
49	Winn AH	Ft. Stewart	$20,865	8,182	$17,230	-17%	$17,832	-15%	3%
57	Irwin AH	Ft. Riley	$19,734	10,635	$22,098	12%	$22,835	16%	3%
58	Munson AH	Ft. Leavenworth	$10,749	5,357	$11,626	8%	$12,072	12%	4%
60	Blanchfield ACH	Ft. Campbell	$28,992	16,357	$33,451	15%	$34,505	19%	3%
61	Ireland AH	Ft. Knox	$23,451	12,201	$25,205	7%	$26,028	11%	3%
64	Bayne-Jones AH	Ft. Polk	$16,932	8,186	$17,239	2%	$17,840	5%	3%
69	Kimbrough AH	Ft. Meade	$26,512	11,934	$24,675	-7%	$25,484	-4%	3%
70	Cutler AH	Ft. Devens	$11,414	4,383	$9,693	-15%	$10,084	-12%	4%
75	Wood AH	Ft. Leonard Wood	$27,497	12,350	$25,500	-7%	$26,332	-4%	3%
81	Patterson AH	Ft. Monmouth	$12,263	4,018	$8,969	-27%	$9,340	-24%	4%
82	Walson AH	Ft. Dix	$18,962	7,191	$15,265	-19%	$15,811	-17%	4%
86	Keller AH	West Point	$10,119	4,164	$9,259	-8%	$9,638	-5%	4%
89	Womack AH	Ft. Bragg	$33,566	20,759	$42,185	26%	$43,482	30%	3%
98	Reynolds AH	Ft. Sill	$23,878	11,593	$23,998	0%	$24,788	4%	3%
105	Moncrief AH	Ft. Jackson	$20,091	9,430	$19,706	-2%	$20,376	1%	3%
110	Darnall AH	Ft. Hood	$35,718	17,937	$36,584	2%	$37,725	6%	3%
121	McDonald AH	Ft. Eustis	$13,928	7,398	$15,675	13%	$16,233	17%	4%
122	Kenner AH	Ft. Lee	$12,708	5,002	$10,920	-14%	$11,346	-11%	4%
123	Dewitt AH	Ft. Belvoir	$19,625	9,076	$19,005	-3%	$19,655	0%	3%
131	Weed ACH	Ft. Irwin	$6,227	2,599	$6,153	-1%	$6,446	4%	5%
294	Hawley AH	Ft. Benjamin Harrison	$6,012	2,910	$6,770	13%	$7,080	18%	5%
ARMY CONUS COMMUNITY HOSPITAL TOTALS			**$541,900**	**254,591**	**$534,032**	**-1%**	**$552,430**	**2%**	**3%**

Source: FY90 Medical Expense and Performance Reporting System (MEPRS) expenses reported by the Defense Medical Information System (DMIS). Expenses stated in thousands.

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EXHIBIT 3-10: MODELED AND OBSERVED FY90 CONUS COMMUNITY HOSPITAL AMBULATORY EXPENSES (CONTINUED)

DMIS ID	NAME	INSTALLATION	FY90 OBSERVED EXPENSES	FY90 VERSION 4 AWUs	FY90 EXPENSES PROJ BY FY88 MODEL (INFLATED)	% DIFF (PROJECTED TO OBSERVED)	FY90 EXPENSES PROJ BY FY90 MODEL	% DIFF (PROJECTED TO OBSERVED)	% DIFF BETWEEN FY88 & FY90 MODEL PROJECTIONS
7	BRH NAVSTA Adak	Adak	$1,925	1,039	$4,182	117%	$4,066	111%	-3%
24	NH Camp Pendleton	Camp Pendleton	$27,079	9,879	$28,160	4%	$26,516	-2%	-6%
25	NH Long Beach	Long Beach	$25,537	5,899	$17,364	-32%	$16,408	-36%	-6%
28	NH Lemoore	Lemoore	$8,482	2,928	$9,306	10%	$8,863	5%	-5%
30	NH Twenty-nine Palms	Twenty-nine Palms	$6,309	3,424	$10,649	69%	$10,121	60%	-5%
35	NH Groton	Groton	$15,748	4,651	$13,978	-11%	$13,238	-16%	-5%
38	NH Pensacola	Pensacola	$28,543	10,706	$30,401	7%	$28,614	0%	-6%
39	NH Jacksonville	Jacksonville	$38,112	12,519	$35,319	-7%	$33,219	-13%	-6%
40	NH Orlando	Orlando	$24,428	9,985	$28,448	16%	$26,785	10%	-6%
56	NH Great Lakes	Great Lakes	$26,195	11,121	$31,529	20%	$29,670	13%	-6%
68	NH Patuxent River	Patuxent River	$7,082	2,299	$7,598	7%	$7,264	3%	-4%
91	NH Camp Lejeune	Camp Lejeune	$24,148	10,136	$28,857	20%	$27,168	13%	-6%
92	NH Cherry Point	Cherry Point	$10,674	3,998	$12,207	14%	$11,579	8%	-5%
99	NH Philadelphia	Philadelphia	$12,880	4 765	$14,288	11%	$13,528	5%	-5%
100	NH Newport	Newport	$14,269	› ,07	$10,876	-24%	$10,333	-28%	-5%
103	NH Charleston	Charleston	$24,551	8,699	$24,959	2%	$23,519	-4%	-6%
104	NH Beaufort	Beaufort	$16,853	6,801	$19,809	18%	$18,697	11%	-6%
107	NH Millington	Millington	$17,469	5,563	$16,451	-6%	$15,553	-11%	-5%
118	NH Corpus Christi	Corpus Christi	$14,825	3,585	$11,087	-25%	$10,531	-29%	-5%
126	NH Bremerton	Bremerton	$20,298	7,250	$21,027	4%	$19,837	-2%	-6%
127	NH Oak Harbor	Oak Harbor	$6,649	3,204	$10,052	51%	$9,562	44%	-5%
NAVY CONUS COMMUNITY HOSPITAL TOTALS			**$372,005**	**131,959**	**$386,547**	**4%**	**$365,073**	**-2%**	**-6%**

Source: FY90 Medical Expense and Performance Reporting System (MEPRS) expenses reported by the Defense Medical Information System (DMIS). Expenses stated in thousands.

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EXHIBIT 3-10: MODELED AND OBSERVED FY90 CONUS COMMUNITY HOSPITAL AMBULATORY EXPENSES (CONTINUED)

DMIS ID	NAME	INSTALLATION	FY90 OBSERVED EXPENSES	FY90 AWUs	FY90 EXPENSES PROJ BY FY88 MODEL (INFLATED)	% DIFF (PROJECTED TO OBSERVED)	FY90 EXPENSES PROJ BY FY90 MODEL	% DIFF (PROJECTED TO OBSERVED)	% DIFF BETWEEN FY88 & FY90 MODEL PROJECTIONS
4	Air University Rgn Hospital	Maxwell AFB	$7,589	5,639	$13,499	78%	$13,052	72%	-3%
6	USAF Hospital Elmendorf	Elmendorf AFB	$16,454	6,497	$15,384	-7%	$14,857	-10%	-3%
9	832nd Medical Group	Luke AFB	$13,332	6,199	$14,728	10%	$14,229	7%	-3%
10	836th Medical Group	Davis Monthan AFB	$15,489	5,657	$13,537	-12%	$13,089	-15%	-3%
11	USAF Hospital Williams	Williams AFB	$7,699	2,778	$7,209	-6%	$7,029	-9%	-3%
12	97th Strategic Hospital	Eaker AFB	$6,019	2,267	$6,086	1%	$5,954	-1%	-2%
13	USAF Hospital Little Rock	Little Rock AFB	$10,107	4,188	$10,309	2%	$9,997	-1%	-3%
15	9th Strategic Hospital	Beale AFB	$6,372	2,240	$6,027	-5%	$5,896	-7%	-2%
16	USAF Hospital Mather	Mather AFB	$11,161	4,186	$10,304	-8%	$9,992	-10%	-3%
17	93rd Strategic Hospital	Castle AFB	$6,545	3,608	$9,035	38%	$8,777	34%	-3%
18	1st Strategic Hospital	Vandenberg AFB	$8,399	3,356	$8,479	1%	$8,245	-2%	-3%
19	USAF Hospital Edwards	Edwards AFB	$6,867	3,207	$8,153	19%	$7,933	16%	-3%
20	831st Medical Group	George AFB	$6,931	2,960	$7,609	10%	$7,412	7%	-3%
21	22nd Strategic Hospital	March AFB	$13,376	5,323	$12,803	-4%	$12,386	-7%	-3%
33	USAF Academy Hospital	USAF Academy	$17,476	6,864	$16,191	-7%	$15,630	-11%	-3%
36	USAF Hospital Dover	Dover AFB	$5,846	3,257	$8,262	41%	$8,036	37%	-3%
42	USAF Rgn Hospital Eglin	Eglin AFB	$25,438	10,326	$23,800	-6%	$22,916	-10%	-4%
43	325th Medical Group	Tyndall AFB	$11,323	3,691	$9,216	-19%	$8,950	-21%	-3%
44	31st Medical Group	Homestead AFB	$11,875	5,002	$12,098	2%	$11,710	-1%	-3%
45	56th Medical Group	Macdill AFB	$18,811	7,385	$17,336	-8%	$16,726	-11%	-4%
46	USAF Hospital Patrick	Patrick AFB	$9,466	3,334	$8,431	-11%	$8,199	-13%	-3%
50	347th Medical Group	Moody AFB	$7,919	2,842	$7,351	-7%	$7,165	-10%	-3%
51	USAF Hospital Robins	Robins AFB	$7,412	3,094	$7,904	7%	$7,694	4%	-3%
53	366th Medical Group	Mountain Home AFB	$7,308	3,028	$7,758	6%	$7,555	3%	-3%
54	USAF Hospital Chanute	Chanute AFB	$7,182	3,121	$7,964	11%	$7,752	8%	-3%
59	384th Strategic Hospital	McConnell AFB	$6,075	2,088	$5,693	-6%	$5,576	-8%	-2%
62	2nd Strategic Hospital	Barksdale AFB	$10,078	5,198	$12,528	24%	$12,122	20%	-3%
63	23rd Medical Group	England AFB	$7,300	2,374	$6,321	-13%	$6,178	-15%	-2%
65	42nd Strategic Hospital	Loring AFB	$4,367	1,827	$5,120	17%	$5,028	15%	-2%
71	379th Strategic Hospital	Wurtsmith AFB	$5,267	2,313	$6,187	17%	$6,050	15%	-2%
72	410th Strategic Hospital	K.I.Sawyer AFB	$5,758	2,312	$6,186	7%	$6,048	5%	-2%

Source: FY90 Medical Expense and Performance Reporting System (MEPRS) expenses reported by the Defense Medical Information System (DMIS). Expenses stated in thousands.

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EXHIBIT 3-10: MODELED AND OBSERVED FY90 CONUS COMMUNITY HOSPITAL AMBULATORY EXPENSES (CONCLUDED)

DMIS ID	NAME	INSTALLATION	FY90 OBSERVED EXPENSES	FY90 AWUs	FY90 EXPENSES PROJ BY FY88 MODEL (INFLATED)	% DIFF (PROJECTED TO OBSERVED)	FY90 EXPENSES PROJ BY FY90 MODEL	% DIFF (PROJECTED TO OBSERVED)	% DIFF BETWEEN FY88 & FY90 MODEL PROJECTIONS
74	USAF Hospital Columbus	Columbus AFB	$4,483	1,500	$4,401	-2%	$4,339	-3%	-1%
76	351st Strategic Hospital	Whiteman AFB	$5,791	2,469	$6,531	13%	$6,379	10%	-2%
78	Ehrling Berquist Rgn Hosp	Offutt AFB	$16,289	7,270	$17,083	5%	$16,484	1%	-4%
79	554th Medical Group	Nellis AFB	$15,184	6,209	$14,750	-3%	$14,250	-6%	-3%
80	509th Strategic Hospital	Pease AFB	$8,245	2,766	$7,184	-13%	$7,005	-15%	-2%
83	USAF Hospital Kirtland	Kirtland AFB	$11,468	4,679	$11,389	-1%	$11,031	-4%	-3%
84	833rd Medical Group	Holloman AFB	$7,339	3,329	$8,421	15%	$8,189	12%	-3%
85	27th Medical Group	Cannon AFB	$6,675	2,742	$7,131	7%	$6,954	4%	-2%
87	380th Strategic Hospital	Plattsburgh AFB	$5,387	2,226	$5,997	11%	$5,868	9%	-2%
88	416th Strategic Hospital	Griffiss AFB	$6,971	2,865	$7,400	6%	$7,212	3%	-3%
90	4th Medical Group	Seymour Johnson AFB	$8,423	3,578	$8,968	6%	$8,713	3%	-3%
93	842nd Strategic Hospital	Grand Forks AFB	$5,553	2,635	$6,896	24%	$6,729	21%	-2%
94	857th Strategic Hospital	Minot AFB	$7,414	3,114	$7,948	7%	$7,737	4%	-3%
96	USAF Hospital Tinker	Tinker AFB	$9,296	4,987	$12,065	30%	$11,679	26%	-3%
97	USAF Hospital Altus	Altus AFB	$5,407	1,867	$5,207	-4%	$5,112	-5%	-2%
101	363rd Medical Group	Shaw AFB	$9,604	3,715	$9,269	-3%	$9,001	-6%	-3%
102	354th Medical Group	Myrtle Beach AFB	$6,570	2,589	$6,795	3%	$6,632	1%	-2%
106	44th Strategic Hospital	Ellsworth AFB	$7,097	3,826	$9,512	34%	$9,234	30%	-3%
111	USAF Hospital Reese	Reese AFB	$5,496	1,735	$4,918	-11%	$4,835	-12%	-2%
112	96th Strategic Hospital	Dyess AFB	$7,861	3,305	$8,367	6%	$8,138	4%	-3%
113	USAF Rgn Hospital Sheppard	Sheppard AFB	$13,601	5,713	$13,661	0%	$13,207	-3%	-3%
114	USAF Hospital Laughlin	Laughlin AFB	$4,095	1,396	$4,171	2%	$4,120	1%	-1%
115	67th Medical Group	Bergstrom AFB	$11,054	4,042	$9,987	-10%	$9,689	-12%	-3%
116	Robert Thompson Strategic Hosp	Carswell AFB	$21,386	7,611	$17,833	-17%	$17,202	-20%	-4%
119	USAF Hospital Hill	Hill AFB	$8,225	3,897	$9,670	18%	$9,385	14%	-3%
120	1st Medical Group	Langley AFB	$17,425	7,937	$18,549	6%	$17,888	3%	-4%
128	92nd Strategic Hospital	Fairchild AFB	$9,752	4,246	$10,435	7%	$10,118	4%	-3%
129	90th Strategic Hospital	F.E. Warren AFB	$5,368	2,613	$6,848	28%	$6,683	24%	-2%
AIR FORCE CONUS COMMUNITY HOSPITAL TOTALS			**$556,654**	**231,019**	**$572,897**	**3%**	**$555,991**	**0%**	**-3%**

Source: FY90 Medical Expense and Performance Reporting System (MEPRS) expenses reported by the Defense Medical Information System (DMIS). Expenses stated in thousands.

- BRH NAVSTA Adak (DMIS ID 7): overestimated by 111%;
- NH Long Beach (DMIS ID 25): underestimated by 36%;
- NH Twenty-nine Palms (DMIS ID 30): 60%;
- NH Newport (DMIS ID 100): -28%;
- NH Corpus Christi (DMIS ID 118): -29%; and
- NH Oak Harbor (DMIS ID 127): 44%.

All of these MTFs also had differences of greater than 25% between FY88 model predicted expenses and FY90 observed expenses except NH Newport (-24%) and NH Corpus Christi (-25%). All Navy CONUS community hospitals had FY90 model predicted ambulatory expenses within six percent of FY88 model predicted expenses. The stability of the Navy CONUS community hospital ambulatory expense models is high.

Thirty-six of 59 Air Force CONUS community hospitals had FY90 ambulatory model predicted expenses within ten percent of actual FY90 expenses. Only five had significant differences, all involving overestimation by the model:

- Air University Regional Hospital -- Maxwell AFB (DMIS ID 4): 72%;
- 93rd Strategic Hospital -- Castle AFB (DMIS ID 17): 34%;
- USAF Hospital Dover -- Dover AFB (DMIS ID 36): 37%;
- USAF Hospital Tinker -- Tinker AFB (DMIS ID 96): 26%; and
- 44th Strategic Hospital -- Ellsworth AFB: (DMIS ID 106): 30%.

Each of these MTFs also had significant differences between FY88 ambulatory model predicted expenses and observed FY90 expenses. In addition, the 90th Strategic Hospital -- F.E. Warren AFB had FY88 model predicted ambulatory expenses 28% greater than FY90 observed expenses (with FY90 model predicted expenses 24% greater). The Air Force ambulatory models demonstrated a great deal of stability, with no MTF having FY90 model

predicted expenses more than four percent different from FY88 model predicted expenses.

3.3 OVERSEAS HOSPITALS

This section provides a detailed presentation of estimates obtained from overseas hospital models. Inpatient nonclinician expenses, inpatient clinician salaries, and ambulatory expenses are discussed separately.

Inpatient Nonclinician Expenses

Predicted and observed FY90 overseas hospital inpatient nonclinician expenses are displayed in exhibit 3-11. NH Okinawa (DMIS ID 621) and 2nd General Hospital -- Landstuhl (DMIS ID 607) were excluded from the modeling prior to final parameter estimation.

Five of eleven Army overseas hospitals had differences of less than ten percent between FY90 model predicted inpatient nonclinician expenses and actual FY90 expenses. Three MTFs had significant differences:

- 2nd Field Hospital -- Bremerhaven (DMIS ID 604): underestimated by 27%;
- 2nd General Hospital -- Landstuhl (DMIS ID 607): overestimated by 31%; and
- Gorgas ACH -- Gorgas, Panama (DMIS ID 613): overestimated by 29%.

For the 2nd Field Hospital -- Bremerhaven, the FY88 model predicted expenses underestimated observed FY90 expenses by more than 25%. For both 2nd General Hospital -- Landstuhl and Gorgas ACH, the FY88 model predicted expenses overestimated FY90 expenses by 19%. In addition, 45th Field Hospital -- Vicenza FY88 model predicted expenses differed from observed FY90 expenses by more than 25%, underestimating by 28% (the FY90 model underestimated by 22%). Finally, six of eleven Army

EXHIBIT 3-11: MODELED AND OBSERVED FY90 OVERSEAS HOSPITAL INPATIENT NONCLINICIAN EXPENSES

DMIS ID	NAME	INSTALLATION	FY90 OBSERVED EXPENSES	FY90 VERSION 4 IWUs	FY90 EXPENSES PROJ BY FY88 MODEL (INFLATED)	% DIFF (PROJECTED TO OBSERVED)	FY90 VERSION 8 IWUs	FY90 EXPENSES PROJ BY FY90 MODEL	% DIFF (PROJECTED TO OBSERVED)	% DIFF BETWEEN FY88 & FY90 MODEL PROJECTIONS
601	34th General Hospital	Augsburg	$8,674	3,158	$7,250	-16%	2,969	$7,643	-12%	5%
602	5th General Hospital	Bad Cannstatt	$13,895	5,526	$12,284	-12%	5,746	$14,315	3%	17%
604	2nd Field Hospital	Bremerhaven	$5,576	1,579	$3,894	-30%	1,479	$4,063	-27%	4%
605	97th General Hospital	Frankfurt	$25,716	9,902	$21,584	-16%	9,985	$24,498	-5%	13%
606	130th Station Hospital	Heidelberg	$12,167	4,294	$9,665	-21%	4,195	$10,588	-13%	10%
607	2nd General Hospital	Landstuhl	$22,679	12,446	$26,992	19%	12,110	$29,603	31%	10%
608	98th General Hospital	Nuernberg	$15,083	6,766	$14,919	-1%	6,694	$16,592	10%	11%
609	67th Evacuation Hospital	Wurzburg	$9,180	3,443	$7,855	-14%	3,409	$8,700	-5%	11%
611	45th Field Hospital	Vicenza	$3,361	890	$2,428	-28%	885	$2,637	-22%	9%
612	121st Evacuation Hospital	Seoul	$13,860	6,124	$13,553	-2%	6,069	$15,090	9%	11%
613	Gorgas ACH	Gorgas	$12,963	7,003	$15,422	19%	6,750	$16,726	29%	8%
	ARMY OVERSEAS HOSPITAL TOTALS		**$143,155**	**61,132**	**$135,847**	**-5%**	**60,290**	**$150,456**	**5%**	**11%**
615	NH Guantanamo Bay	Guantanamo Bay	$3,166	943	$2,907	-8%	1,028	$2,871	-9%	-1%
616	NH Roosevelt Roads	Ceiba	$6,509	1,827	$5,055	-22%	1,927	$4,953	-24%	-2%
617	NH Naples	Naples	$6,126	2,190	$5,937	-3%	2,230	$5,653	-8%	-5%
618	NH Rota	Rota	$5,570	2,518	$6,735	21%	2,481	$6,233	12%	-7%
619	NH Subic Bay	Subic Bay	$6,902	3,195	$8,381	21%	3,358	$8,264	20%	-1%
620	NH Guam	Agana	$9,703	3,546	$9,234	-5%	3,684	$9,018	-7%	-2%
621	NH Okinawa	Okinawa	$28,079	5,852	$14,839	-47%	6,146	$14,716	-48%	-1%
622	NH Yokosuka	Yokosuka	$8,900	3,428	$8,946	1%	3,576	$8,768	-1%	-2%
623	NH Keflavik	Iceland	$744	466	$1,748	135%	503	$1,656	123%	-5%
	NAVY OVERSEAS HOSPITAL TOTALS		**$75,699**	**23,966**	**$63,783**	**-16%**	**24,933**	**$62,132**	**-18%**	**-3%**

Source: FY90 Medical Expense and Performance Reporting System (MEPRS) expenses reported by the Defense Medical Information System (DMIS). Expenses stated in thousands.

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EXHIBIT 3-11: MODELED AND OBSERVED FY90 OVERSEAS HOSPITAL INPATIENT NONCLINICIAN EXPENSES (CONCLUDED)

DMIS ID	NAME	INSTALLATION	FY90 OBSERVED EXPENSES	FY90 VERSION 4 IWUs	FY90 EXPENSES PROJ BY FY88 MODEL (INFLATED)	% DIFF (PROJECTED TO OBSERVED)	FY90 VERSION 8 IWUs	FY90 EXPENSES PROJ BY FY90 MODEL	% DIFF (PROJECTED TO OBSERVED)	% DIFF BETWEEN FY88 & FY90 MODEL PROJECTIONS
626	USAF Hospital Bitburg	Bitburg AB	$4,174	1,737	$3,835	-8%	1,713	$3,995	-4%	4%
627	USAF Hospital Hahn	Hahn AB	$2,560	1,015	$2,443	-5%	973	$2,459	-4%	1%
629	USAF Hospital Lajes	Lajes Field	$2,283	650	$1,741	-24%	612	$1,711	-25%	-2%
630	USAF Hospital Torrejon	Torrejon AB	$4,672	1,492	$3,362	-28%	1,484	$3,520	-25%	-5%
631	USAF Hospital Hellenikon	Hellenikon AB	$866	251	$971	12%	325	$1,114	29%	15%
632	USAF Hospital Upper Heyford	RAF Upper Heyford	$3,825	2,618	$5,534	45%	2,698	$6,037	58%	9%
633	USAF Rgn Hospital Lakenheath	RAF Lakenheath	$8,689	4,009	$8,216	-5%	4,191	$9,133	5%	11%
635	USAF Hospital Incirlik	Incirlik AB	$2,159	1,029	$2,470	14%	1,011	$2,538	18%	3%
636	13th Medical Center	Clark AB	$18,487	8,050	$16,004	-13%	7,975	$16,980	-8%	6%
637	8th Medical Group	Kunsan AB	$709	276	$1,020	44%	293	$1,050	48%	3%
638	51st Medical Group	Osan AB	$2,096	821	$2,069	-1%	791	$2,081	-1%	1%
639	432nd Medical Group	Misawa	$2,880	1,246	$2,888	0%	1,332	$3,204	11%	11%
640	475th Medical Group	Yokota AB	$4,675	1,711	$3,786	-19%	1,738	$4,045	-13%	7%
AIR FORCE OVERSEAS HOSPITAL TOTALS			**$58,075**	**24,905**	**$54,340**	**-6%**	**25,137**	**$57,866**	**0%**	**6%**

Source: FY90 Medical Expense and Performance Reporting System (MEPRS) expenses reported by the Defense Medical Information System (DMIS). Expenses stated in thousands.

MTFs had differences between FY90 and FY88 model predicted expenses of ten percent or less, and three more had differences of 11%.

Four of nine Navy overseas hospitals had FY90 model predicted inpatient nonclinician expenses within ten percent of FY90 observed expenses. Two Navy MTFs had significant differences:

- NH Okinawa (DMIS ID 621): underestimated by 48%; and
- NH Keflavik (DMIS ID 623): overestimated by 123%.

Both of these facilities also had significant differences between FY88 model projections and FY90 observed expenses. All Navy overseas nospital FY90 model inpatient nonclinician expense projections were within seven percent of FY88 model predictions. The Navy overseas hospital models appear quite stable.

Five of thirteen Air Force overseas hospitals had FY90 model predicted inpatient nonclinician expenses within ten percent of FY90 observed expenses. Three MTFs had significant differences, all involving model overestimation:

- USAF Hospital Hellenikon (DMIS ID 631): 29%;
- USAF Hospital Upper Heyford (DMIS ID 632): 58%; and
- 8th Medical Group -- Kunsan AB (DMIS ID 637): 44%.

It is worth noting that both USAF Hellenikon and 8th Medical Group were very small, each having less than 350 IWUs. Both USAF Hospital Upper Heyford and 13th Medical Center also had significant differences between FY88 model projections and FY90 observed ambulatory expenses. USAF Hospital Hellenikon had a 12% difference between FY88 model predicted expenses and observed FY90 expenses. This change in predicted expenses is attributable to the considerable change in IWUs caused by the different grouper version; FY90 Version 8 IWUs were 29% higher than Version 4 IWUs. USAF Hospital Torrejon had FY88 model predicted expenses 28 percent less than FY90 observed expenses, and FY90 model predicted ex-

penses 25% less. Air Force overseas inpatient nonclinician expense models appeared fairly stable; seven MTFs had differences between FY88 and FY90 model predicted expenses of five percent or less, and ten had differences of less than ten percent.

Inpatient Clinician Salaries

FY90 predicted and observed overseas hospital inpatient clinician salaries are presented in exhibit 3-12. Thirteen overseas hospitals out of 33 had FY90 model predicted inpatient clinician salaries varying by more than 25% from FY90 actual expenses. The Navy had the most variation, (six out of nine MTFs had significant differences), followed by the Air Force (six out of 13 MTFs), with the Army having the least variation (one out of 11 MTFs). Eleven MTFs had differences of less than ten percent. Five of these were from the Army, four from the Air Force, and two from the Navy. In terms of stability, 11 MTFs had FY88 model predictions more than 25% different from FY90 observed values. All of these MTFs were also among those with significant differences between FY90 model predicted and observed expenses. Nine Army facilities had FY90 model predictions varying by less than five percent from FY88 model predictions, and all eleven varied by less than ten percent. Eight Navy MTFs had FY90 model predictions varying from FY88 model predictions by ten percent or less. Twelve Air Force MTFs varied by six percent or less. USAF Hospital Hellenikon's predictions varied by 28% from each other, corresponding closely to the 29% shift in workload due to the grouper version change noted previously.

Because clinician salaries are a small component of total inpatient expenses (generally about five percent), the fact that these expenses are not as accurately estimated as the inpatient nonclinician expenses has little influence on the accuracy of the estimate of total

EXHIBIT 3-12: MODELED AND OBSERVED FY90 OVERSEAS HOSPITAL INPATIENT CLINICIAN SALARIES

DMIS ID	NAME	INSTALLATION	FY90 OBSERVED EXPENSES	FY90 VERSION 4 IWUs	FY90 EXPENSES PROJ BY FY88 MODEL (INFLATED)	% DIFF (PROJECTED TO OBSERVED)	FY90 VERSION 8 IWUs	FY90 EXPENSES PROJ BY FY90 MODEL	% DIFF (PROJECTED TO OBSERVED)	% DIFF BETWEEN FY88 & FY90 MODEL PROJECTIONS
601	34th General Hospital	Augsburg	$576	3,158	$482	-16%	2,969	$475	-18%	-1%
602	5th General Hospital	Bad Cannstatt	$863	5,526	$843	-2%	5,746	$919	7%	9%
604	2nd Field Hospital	Bremerhaven	$193	1,579	$241	25%	1,479	$237	23%	-2%
605	97th General Hospital	Frankfurt	$1,416	9,902	$1,511	7%	9,985	$1,598	13%	6%
606	130th Station Hospital	Heidelberg	$625	4,294	$655	5%	4,195	$671	7%	2%
607	2nd General Hospital	Landstuhl	$2,108	12,446	$1,899	-10%	12,110	$1,938	-8%	2%
608	98th General Hospital	Nuernberg	$845	6,766	$1,032	22%	6,694	$1,071	27%	4%
609	67th Evacuation Hospital	Wurzburg	$533	3,443	$525	-2%	3,409	$545	2%	4%
611	45th Field Hospital	Vicenza	$125	890	$136	8%	885	$142	13%	4%
612	121st Evacuation Hospital	Seoul	$1,176	6,124	$934	-21%	6,069	$971	-17%	4%
613	Gorgas ACH	Gorgas	$1,187	7,003	$1,068	-10%	6,750	$1,080	-9%	1%
	ARMY OVERSEAS HOSPITAL TOTALS		**$9,647**	**61,132**	**$9,325**	**-3%**	**60,290**	**$9,647**	**0%**	**3%**
615	NH Guantanamo Bay	Guantanamo Bay	$86	943	$155	81%	1,028	$150	75%	-3%
616	NH Roosevelt Roads	Ceiba	$217	1,827	$300	39%	1,927	$281	30%	-6%
617	NH Naples	Naples	$403	2,190	$360	-11%	2,230	$325	-19%	-10%
618	NH Rota	Rota	$333	2,518	$414	24%	2,481	$362	9%	-13%
619	NH Subic Bay	Subic Bay	$518	3,195	$525	1%	3,358	$490	-5%	-7%
620	NH Guam	Agana	$999	3,546	$583	-42%	3,684	$537	-46%	-8%
621	NH Okinawa	Okinawa	$689	5,852	$962	40%	6,146	$896	30%	-7%
622	NH Yokosuka	Yokosuka	$339	3,428	$563	66%	3,576	$521	54%	-7%
623	NH Keflavik	Iceland	$53	466	$77	46%	503	$73	39%	-4%
	NAVY OVERSEAS HOSPITAL TOTALS		**$3,635**	**23,966**	**$3,938**	**8%**	**24,933**	**$3,635**	**0%**	**-8%**

Source: FY90 Medical Expense and Performance Reporting System (MEPRS) expenses reported by the Defense Medical Information System (DMIS). Expenses stated in thousands.

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EXHIBIT 3-12: MODELED AND OBSERVED FY90 OVERSEAS HOSPITAL INPATIENT CLINICIAN SALARIES (CONCLUDED)

DMIS ID	NAME	INSTALLATION	FY90 OBSERVED EXPENSES	FY90 VERSION 4 IWUs	FY90 EXPENSES PROJ BY FY88 MODEL (INFLATED)	% DIFF (PROJECTED TO OBSERVED)	FY90 VERSION 8 IWUs	FY90 EXPENSES PROJ BY FY90 MODEL	% DIFF (PROJECTED TO OBSERVED)	% DIFF BETWEEN FY88 & FY90 MODEL PROJECTIONS
626	USAF Hospital Bitburg	Bitburg AB	$153	1,737	$167	9%	1,713	$164	7%	-2%
627	USAF Hospital Hahn	Hahn AB	$128	1,015	$98	-24%	973	$93	-28%	-5%
629	USAF Hospital Lajes	Lajes Field	$64	650	$63	-2%	612	$59	-8%	-6%
630	USAF Hospital Torrejon	Torrejon AB	$127	1,492	$144	13%	1,484	$142	12%	-1%
631	USAF Hospital Hellenikon	Hellenikon AB	$12	251	$24	108%	325	$31	168%	28%
632	USAF Hospital Upper Heyford	RAF Upper Heyford	$206	2,618	$252	22%	2,698	$258	25%	2%
633	USAF Rgn Hospital Lakenheath	RAF Lakenheath	$382	4,009	$386	1%	4,191	$401	5%	4%
635	USAF Hospital Incirlik	Incirlik AB	$103	1,029	$99	-4%	1,011	$97	-6%	-2%
636	13th Medical Center	Clark AB	$854	8,050	$775	-9%	7,975	$763	-11%	-1%
637	8th Medical Group	Kunsan AB	$14	276	$27	86%	293	$28	97%	6%
638	51st Medical Group	Osan AB	$49	821	$79	60%	791	$76	53%	-4%
639	432nd Medical Group	Misawa	$73	1,246	$120	65%	1,332	$127	75%	6%
640	475th Medical Group	Yokota AB	$240	1,711	$165	-31%	1,738	$166	-31%	1%
AIR FORCE OVERSEAS HOSPITAL TOTALS			**$2,405**	**24,905**	**$2,396**	**0%**	**25,137**	**$2,405**	**0%**	**0%**

Source: FY90 Medical Expense and Performance Reporting System (MEPRS) expenses reported by the Defense Medical Information System (DMIS). Expenses stated in thousands.

expenses. Similarly, although these models are not as stable, in general, as inpatient nonclinician (or ambulatory, as will be seen), this instability has little influence on the stability of total predicted expenses.

Ambulatory Expenses

Exhibit 3-13 presents FY90 predicted and observed overseas hospital ambulatory expenses. As pointed out in Chapter 2.0, NH Okinawa (DMIS ID 621) was excluded from the ambulatory expense modeling prior to estimating final parameters. Note that there is one facility included in the overseas hospital ambulatory modeling which was not included in the inpatient models: USAF Hospital Iraklion (DMIS ID 634). This facility reported FY90 MEPRS data, allowing it to be included in the ambulatory modeling, but did not submit Biometrics data, precluding it from the inpatient modeling.

As the exhibit reveals, five out of 11 Army overseas hospitals had differences of less than ten percent between FY90 model predictions and FY90 actual expenses. No Army overseas hospital had significant differences between either FY90 model or FY88 model predicted expenses and FY90 actual expenses. Ten facilities had FY90 model predicted expenses within five percent of FY88 model predicted expenses, and the predictions for the remaining MTF differed by eight percent.

Five out of nine Navy overseas hospitals had differences of less than ten percent between FY90 ambulatory model predictions and FY90 actual expenses. Two facilities had significant differences between FY90 model predictions and observed FY90 budgets:

- NH Okinawa (DMIS ID 621): underestimated 46%; and
- NH Keflavik (DMIS ID 623): overestimated by 135%.

EXHIBIT 3-13: MODELED AND OBSERVED FY90 OVERSEAS HOSPITAL AMBULATORY EXPENSES

DMIS ID	NAME	INSTALLATION	FY90 OBSERVED EXPENSES	FY90 AWUs	FY90 EXPENSES PROJ BY FY88 MODEL (INFLATED)	% DIFF (PROJECTED TO OBSERVED)	FY90 EXPENSES PROJ BY FY90 MODEL	% DIFF (PROJECTED TO OBSERVED)	% DIFF BETWEEN FY88 & FY90 MODEL PROJECTIONS
601	34th General Hospital	Augsburg	$14,959	5,481	$14,625	-2%	$14,808	-1%	1%
602	5th General Hospital	Bad Cannstatt	$22,086	7,970	$20,270	-8%	$20,885	-5%	3%
604	2nd Field Hospital	Bremerhaven	$9,030	2,834	$8,620	-5%	$8,344	-8%	-3%
605	97th General Hospital	Frankfurt	$40,721	15,039	$36,305	-11%	$38,145	-6%	5%
606	130th Station Hospital	Heidelberg	$20,911	8,905	$22,390	7%	$23,167	11%	3%
607	2nd General Hospital	Landstuhl	$27,569	12,483	$30,508	11%	$31,905	16%	5%
608	98th General Hospital	Nuernberg	$28,836	12,639	$30,861	7%	$32,285	12%	5%
609	67th Evacuation Hospital	Wurzburg	$19,165	8,231	$20,862	9%	$21,522	12%	3%
611	45th Field Hospital	Vicenza	$7,218	1,714	$6,079	-16%	$5,608	-22%	-8%
612	121st Evacuation Hospital	Seoul	$27,569	8,912	$22,407	-19%	$23,185	-16%	3%
613	Gorgas ACH	Gorgas	$15,934	5,466	$14,591	-8%	$14,771	-7%	1%
	ARMY OVERSEAS HOSPITAL TOTALS		**$233,999**	**89,675**	**$227,517**	**-3%**	**$234,626**	**0%**	**3%**
615	NH Guantanamo Bay	Guantanamo Bay	$4,986	1,320	$5,901	18%	$4,504	-10%	-24%
616	NH Roosevelt Roads	Ceiba	$8,144	2,284	$8,388	3%	$6,784	-17%	-19%
617	NH Naples	Naples	$10,733	3,288	$10,980	2%	$9,160	-15%	-17%
618	NH Rota	Rota	$7,211	2,557	$9,094	26%	$7,431	3%	-18%
619	NH Subic Bay	Subic Bay	$10,170	4,126	$13,143	29%	$11,144	10%	-15%
620	NH Guam	Agana	$10,273	4,132	$13,160	28%	$11,159	9%	-15%
621	NH Okinawa	Okinawa	$27,240	5,642	$17,057	-37%	$14,731	-46%	-14%
622	NH Yokosuka	Yokosuka	$15,100	5,263	$16,078	6%	$13,834	-8%	-14%
623	NH Keflavik	Iceland	$1,420	827	$4,629	226%	$3,337	135%	-28%
	NAVY OVERSEAS HOSPITAL TOTALS		**$95,277**	**29,440**	**$98,431**	**3%**	**$82,085**	**-14%**	**-17%**

Source: FY90 Medical Expense and Performance Reporting System (MEPRS) expenses reported by the Defense Medical Information System (DMIS). Expenses stated in thousands.

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EXHIBIT 3-13: MODELED AND OBSERVED FY90 OVERSEAS HOSPITAL AMBULATORY EXPENSES (CONCLUDED)

DMIS ID	NAME	INSTALLATION	FY90 OBSERVED EXPENSES	FY90 AWUs	FY90 EXPENSES PROJ BY FY88 MODEL (INFLATED)	% DIFF (PROJECTED TO OBSERVED)	FY90 EXPENSES PROJ BY FY90 MODEL	% DIFF (PROJECTED TO OBSERVED)	% DIFF BETWEEN FY88 & FY90 MODEL PROJECTIONS
626	USAF Hospital Bitburg	Bitburg AB	$5,073	2,634	$6,606	30%	$6,545	29%	-1%
627	USAF Hospital Hahn	Hahn AB	$5,842	2,552	$6,455	16%	$6,378	15%	-1%
629	USAF Hospital Lajes	Lajes Field	$2,476	884	$3,393	37%	$2,983	21%	-12%
630	USAF Hospital Torrejon	Torrejon AB	$8,904	1,982	$5,409	-39%	$5,218	-41%	-4%
631	USAF Hospital Hellenikon	Hellenikon AB	$2,984	692	$3,042	2%	$2,594	-13%	-15%
632	USAF Hospital Upper Heyford	RAF Upper Heyford	$5,362	2,626	$6,591	23%	$6,528	22%	-1%
633	USAF Rgn Hospital Lakenheath	RAF Lakenheath	$10,815	4,158	$9,403	-13%	$9,646	-11%	3%
634	USAF Hospital Iraklion	Iraklion AS	$2,121	425	$2,552	20%	$2,050	-3%	-20%
635	USAF Hospital Incirlik	Incirlik AB	$2,639	1,273	$4,109	56%	$3,776	43%	-8%
636	13th Medical Center	Clark AB	$14,523	7,118	$14,835	2%	$15,669	8%	6%
637	8th Medical Group	Kunsan AB	$2,225	663	$2,989	34%	$2,535	14%	-15%
638	51st Medical Group	Osan AB	$5,869	1,790	$5,056	-14%	$4,827	-18%	-5%
639	432nd Medical Group	Misawa	$5,178	2,541	$6,435	24%	$6,356	23%	-1%
640	475th Medical Group	Yokota AB	$7,923	2,646	$6,628	-16%	$6,570	-17%	-1%
AIR FORCE OVERSEAS HOSPITAL TOTALS			**$81,633**	**31,985**	**$83,503**	**2%**	**$81,676**	**0%**	**-2%**

Source: FY90 Medical Expense and Performance Reporting System (MEPRS) expenses reported by the Defense Medical Information System (DMIS). Expenses stated in thousands.

Both of these hospitals also had significant differences between FY88 model predictions and FY90 observed expenses. Three additional overseas MTFs had significant differences between FY88 model predictions and actual FY90 expenses:

- NH Rota (DMIS ID 618): FY88 model overestimated by 26%, FY90 model overestimated by 3%;
- NH Subic Bay (DMIS ID 619): FY88 model overestimated by 29%, FY90 model overestimated by 10%; and
- NH Guam (DMIS ID 621): FY88 model overestimated by 28%, FY90 model overestimated by 9%.

FY88 and FY90 model predictions were no closer together than 14% for any Navy MTF. Clearly, the Navy overseas hospital models are not as stable as other models that have been examined.

Only two of 14 FY90 Air Force overseas hospital model predicted ambulatory expense projections were within ten percent of FY90 observed expenses. Three facilities had significant differences between FY90 model predictions and FY90 actual expenses:

- USAF Hospital Bitburg (DMIS ID 626): overestimated by 29%;
- USAF Hospital Torrejon (DMIS ID 630): underestimated by 41%; and
- USAF Hospital Incirlik (DMIS ID 635): overestimated by 43%.

Each of these facilities also had significant differences between FY88 model predictions and FY90 observed expenses, as well as the following two MTFs:

- USAF Hospital Lajes (DMIS ID 629): FY88 model overestimated by 37%, FY90 model overestimated by 21%; and
- 8th Medical Group -- Kunsan AB (DMIS ID 637): FY88 model overestimated by 34%, FY90 model overestimated by 14%.

Ten of the 14 Air Force MTFs had FY88 and FY90 model predictions within ten percent of each other. While there was some inaccuracy involved in the FY90 model projections, the Air Force overseas ambulatory models did demonstrate a fair level of stability.

3.4 CLINICS

This section provides a detailed presentation of estimates obtained from clinic ambulatory expense models. As with hospitals, PRIMUS/NAVCARE and Occupational Health clinic expenses and workload were excluded from consideration in the modeling. As noted in chapter 2.0, NMCL Port Hueneme and NMCL Pearl Harbor were excluded from the modeling prior to final parameter estimation.

FY90 clinic predicted and observed ambulatory expenses are presented in exhibit 3-14. Neither Army clinic had FY90 or FY88 model predicted expenses significantly different from observed FY90 expenses.

Of nine Navy clinics, only one had a difference of less than ten percent between FY90 model predicted expenses and FY90 observed expenses. Five Navy clinics had differences of greater than 25%:

- NMCL Port Hueneme (DMIS ID 26): overestimated by 248%;
- NMCL Pearl Harbor (DMIS ID 280): underestimated by 35%;
- NMCL Portsmouth (DMIS ID 321): overestimated 27%;
- NMCL Seattle (DMIS ID 396): overestimated by 51%; and
- NMCL London (DMIS ID 8931): overestimated by 39%.

These same five MTFs had similar differences between FY88 model predictions and observed FY90 predictions. Four of nine Navy clinics had differences of less than ten percent between FY88 and FY90 ambulatory model predicted expenses.

Of 40 Air Force clinics, 21 had differences of less than ten percent between FY90 model predicted expenses and actual FY90 budgets. Four clinics had significant differences:

- USAF Clinic Los Angeles (DMIS ID 248): underestimated 26%;
- USAF Clinic Vance (DMIS ID 338): overestimated 31%;
- USAF Clinic Geilenkirchen (DMIS ID 799): overestimated 44%; and
- USAF Clinic Fairford (DMIS ID 815): overestimated by 29%.

EXHIBIT 3-14: MODELED AND OBSERVED FY90 CLINIC AMBULATORY EXPENSES

DMIS ID	NAME	INSTALLATION	FY90 OBSERVED EXPENSES	FY90 AWUs	FY90 EXPENSES PROJ BY FY88 MODEL (INFLATED)	% DIFF (PROJECTED TO OBSERVED)	FY90 EXPENSES PROJ BY FY90 MODEL	% DIFF (PROJECTED TO OBSERVED)	% DIFF BETWEEN FY88 & FY90 MODEL PROJECTIONS
330	Wilcox AH/C Ft. Drum	Ft. Drum	$12,620	4,511	$11,159	-12%	$12,752	1%	14%
610	USAHC Sagami, Japan	Japan	$3,227	844	$3,663	13%	$3,127	-3%	-15%
	ARMY CLINIC TOTALS		**$15,847**	**5,354**	**$14,822**	**-6%**	**$15,878**	**0%**	**7%**
26	NMCL Port Hueneme	Port Hueneme	$1,837	2,004	$6,255	240%	$6,395	248%	2%
41	NMCL Key West	Key West	$3,297	834	$3,776	15%	$3,213	-3%	-15%
280	NMCL Pearl Harbor	Pearl Harbor	$27,625	6,232	$15,214	-45%	$17,892	-35%	18%
297	NMCL New Orleans	New Orleans	$4,047	966	$4,057	0%	$3,573	-12%	-12%
306	NMCL Annapolis	Annapolis	$8,621	2,422	$7,141	-17%	$7,531	-13%	5%
321	NMCL Portsmouth	Portsmouth	$3,579	1,324	$4,814	35%	$4,545	27%	-6%
385	NMCL Quantico	Quantico	$10,277	2,767	$7,873	-23%	$8,471	-18%	8%
396	NMCL Seattle	Seattle	$1,853	682	$3,454	86%	$2,800	51%	-19%
8931	NMCL London	London	$2,646	1,006	$4,140	56%	$3,681	39%	-11%
	NAVY CLINIC TOTALS		**$63,783**	**18,238**	**$56,723**	**-11%**	**$58,101**	**-9%**	**2%**
77	341st Strategic Clinic	Malmstrom AFB	$6,421	2,327	$4,771	-26%	$5,609	-13%	18%
203	USAF Clinic Eielson	Eielson AFB	$4,230	1,645	$3,778	-11%	$4,180	-1%	11%
248	USAF Clinic Los Angeles	Los Angeles AFS	$3,148	762	$2,491	-21%	$2,327	-26%	-7%
249	USAF Clinic Norton	Norton AFB	$6,626	2,137	$4,494	-32%	$5,210	-21%	16%
250	USAF Clinic McClellan	McClellan AFB	$5,561	2,487	$5,005	-10%	$5,946	7%	19%
251	USAF Clinic Lowry	Lowry AFB	$2,718	932	$2,740	1%	$2,685	-1%	-2%
252	USAF Clinic Peterson	Peterson AFB	$6,426	2,643	$5,231	-19%	$6,272	-2%	20%
287	15th Medical Group	Hickam AFB	$5,854	2,527	$5,062	-14%	$6,029	3%	19%
293	305th Strategic Clinic	Grissom AFB	$4,246	1,700	$3,857	-9%	$4,294	1%	11%
310	USAF Clinic Hanscom	Hanscom AFB	$3,251	1,021	$2,868	-12%	$2,870	-12%	0%
326	USAF Clinic McGuire	McGuire AFB	$3,167	1,428	$3,461	9%	$3,724	18%	8%
335	USAF Clinic Pope	Pope AFB	$3,875	1,580	$3,683	-5%	$4,042	4%	10%
338	USAF Clinic Vance	Vance AFB	$1,926	856	$2,629	36%	$2,526	31%	-4%
356	USAF Clinic Charleston	Charleston AFB	$5,044	1,798	$4,001	-21%	$4,500	-11%	12%
363	USAF Clinic Brooks	Brooks AFB	$2,330	794	$2,538	9%	$2,394	3%	-6%
364	USAF Clinic Goodfellow	Goodfellow AFB	$3,682	1,308	$3,287	-11%	$3,474	-6%	6%

Source: FY90 Medical Expense and Performance Reporting System (MEPRS) expenses reported by the Defense Medical Information System (DMIS). Expenses stated in thousands.

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EXHIBIT 3-14: MODELED AND OBSERVED FY90 CLINIC AMBULATORY EXPENSES (CONCLUDED)

DMIS ID	NAME	INSTALLATION	FY90 OBSERVED EXPENSES	FY90 AWUs	FY90 EXPENSES PROJ BY FY88 MODEL (INFLATED)	% DIFF (PROJECTED TO OBSERVED)	FY90 EXPENSES PROJ BY FY90 MODEL	% DIFF (PROJECTED TO OBSERVED)	% DIFF BETWEEN FY88 & FY90 MODEL PROJECTIONS
365	USAF Clinic Kelly	Kelly AFB	$4,136	1,511	$3,582	-13%	$3,898	-6%	9%
366	USAF Clinic Randolph	Randolph AFB	$6,161	2,605	$5,176	-16%	$6,193	1%	20%
395	USAF Clinic McChord	McChord AFB	$3,300	1,350	$3,349	1%	$3,562	8%	6%
449	24th Medical Group	Howard AFB	$2,463	1,000	$2,838	15%	$2,826	15%	0%
799	USAF Clinic Geilenkirchen	Geilenkirchen AB	$1,513	692	$2,389	58%	$2,181	44%	-9%
800	USAF Clinic Rhein Main	Rhein Main AB	$3,765	1,704	$3,864	3%	$4,304	14%	11%
801	USAF Clinic Sembach	Sembach AB	$3,225	1,400	$3,420	6%	$3,665	14%	7%
802	43rd Strategic Clinic	Anderson AFB	$3,916	1,646	$3,779	-4%	$4,181	7%	11%
804	313th Medical Group	Kadena AFB	$7,336	3,338	$6,244	-15%	$7,730	5%	24%
805	USAF Clinic Spangdahlem	Spangdahlem AB	$3,892	1,398	$3,419	-12%	$3,662	-6%	7%
806	USAF Clinic Ramstein	Ramstein AB	$7,186	3,761	$6,860	-5%	$8,617	20%	26%
807	USAF Clinic Zweibrucken	Zweibrucken AB	$3,262	1,442	$3,482	7%	$3,753	15%	8%
808	USAF Clinic Aviano	Aviano AB	$2,832	889	$2,676	-6%	$2,594	-8%	-3%
809	USAF Clinic San Vito	San Vito AS	$2,429	538	$2,165	-11%	$1,858	-24%	-14%
811	USAF Clinic Zaragoza	Zaragoza AB	$1,691	407	$1,974	17%	$1,583	-6%	-20%
812	USAF Clinic Bentwaters	RAF Bentwaters	$4,011	1,710	$3,872	-3%	$4,315	8%	11%
813	USAF Clinic Chicksands	RAF Chicksands	$1,508	511	$2,126	41%	$1,802	20%	-15%
814	USAF Clinic Alconbury	RAF Upwood	$4,067	1,345	$3,341	-18%	$3,550	-13%	6%
815	USAF Clinic Fairford	RAF Fairford	$1,369	495	$2,102	54%	$1,767	29%	-16%
824	USAF Clinic Ankara	Ankara AS	$1,756	295	$1,812	3%	$1,349	-23%	-26%
825	USAF Clinic Izmir	Izmir	$1,995	393	$1,954	-2%	$1,553	-22%	-20%
827	USAF Clinic Camp New Amsterdam	Soesterberg AB	$1,898	548	$2,180	15%	$1,879	-1%	-14%
1160	USAF Clinic Comiso	Comiso AS	$1,826	500	$2,110	16%	$1,779	-3%	-16%
1947	USAF Clinic Greenham Common	RAF Greenham Common	$1,986	588	$2,238	13%	$1,963	-1%	-12%
AIR FORCE CLINIC TOTALS			**$146,030**	**56,009**	**$136,848**	**-6%**	**$146,646**	**0%**	**7%**

Source: FY90 Medical Expense and Performance Reporting System (MEPRS) expenses reported by the Defense Medical Information System (DMIS). Expenses stated in thousands.

Of these clinics, all but USAF Clinic Los Angeles also had FY88 model predicted expenses significantly different from observed FY90 expenses. For USAF Clinic Los Angeles, the FY88 model underestimated the actual FY90 expenses by 21%. There were three additional clinics with significant differences between FY88 model predictions and FY90 actual expenses:

- 341st Strategic Clinic -- Malmstrom AFB (DMIS ID 77): FY88 model underestimated by 26%, FY90 model underestimated by 13%;
- USAF Clinic Norton -- Norton AFB (DMIS ID 249): FY88 model underestimated by 32%, FY90 model underestimated by 21%; and
- USAF Clinic Chicksands -- RAF Chicksands (DMIS ID 813): FY88 model overestimated by 41%, FY90 model overestimated by 20%.

Seventeen Air Force clinics had FY90 model predictions within ten percent of FY88 model predictions. In examining the underlying cause for these numbers, the FY90 Air Force clinic model intercept is much lower than the FY88 intercept, while the AWU marginal cost term is much higher. Therefore, clinics with relatively low AWU levels have FY88 model predictions that are much higher than FY90 model predictions. Conversely, clinics with relatively high levels of IWUs have FY88 model predictions that are much lower than FY90 model predictions. While there appears to be some instability in the Air Force clinic models, the clinics at the extreme ends of the AWU spectrum are affected most, while those in the middle are not as strongly affected by the parameter change.

3.5 SUMMARY

This section discusses the accuracy and stability of the FY90 models in projecting total expenses, that is, expenses for each MTF summed over the three expense categories. This section also examines the potential impact of Partnership Program expenses upon the modeling results and projections. Total expense projections and comparisons are

discussed in section 3.5.1. Partnership expenses are discussed in section 3.5.2.

3.5.1 TOTAL EXPENSE PROJECTIONS AND COMPARISONS

This section discusses the accuracy and stability of the FY90 models with respect to projecting total expenses for each MTF. The discussion will be organized by Service branch, and within each Service branch, by facility type.

Army

Total Army FY90 observed expenses and FY90 expenses projected by FY88 and FY90 models are displayed in exhibit 3-15. Note, the following Army MTFs were excluded from the modeling prior to final parameter estimation:

- Tripler AMC (DMIS ID 52) was excluded from the medical center inpatient nonclinician expenses models;
- Walter Reed AMC (DMIS ID 37) was excluded from the medical center ambulatory expense modeling;
- Womack AH (DMIS ID 89) was excluded from the CONUS community hospital inpatient nonclinician and ambulatory expense modeling; and
- 2nd General Hospital -- Landstuhl (DMIS ID 607) was excluded from overseas hospital inpatient nonclinician expense modeling.

The comparisons of FY90 model projections to FY90 observed expenses (including clinics) are summarized graphically in exhibit 3-16. The histogram displays the number of facilities having FY90 total expenses projected by the FY90 models differing from FY90 total expenses projected by the FY88 models by a given percentage range. The exhibit illustrates that 34 out 50 Army MTFs (68%) had differences between observed and projected FY90 expenses of ten percent or less. The one Army facility exhibiting significant differences between observed FY90 total

EXHIBIT 3-15: MODELED AND OBSERVED FY90 ARMY TOTAL EXPENSES

DMIS ID	NAME	INSTALLATION	FY90 OBSERVED EXPENSES	FY90 VERSION 4 IWUs	FY90 AWUs	FY90 EXP PROJ BY FY90 MODEL (INFLATED)	% DIFF	FY90 VERSION 8 IWUs	FY90 EXPENSES PROJ BY FY90 MODEL	% DIFF	% DIFF BETWEEN FY88 & FY90 MODEL PROJECTIONS
22	Letterman AMC	Presidio of S. F.	$84,880	19,603	12,250	$77,840	-8%	19,478	$77,346	-9%	-1%
31	Fitzsimmons AMC	Denver	$110,994	28,752	18,225	$120,894	9%	27,290	$112,794	2%	-7%
37	Walter Reed AMC	Washington	$207,286	49,004	28,651	$206,310	0%	46,498	$182,912	-12%	-11%
47	Eisenhower AMC	Ft. Gordon	$97,718	21,810	15,001	$93,766	-4%	21,691	$92,483	-5%	-1%
52	Tripler AMC	Ft. Shafter	$143,502	28,183	22,037	$125,532	-13%	28,782	$122,998	-14%	-2%
108	William Beaumont AMC	Ft. Bliss	$100,188	22,074	19,194	$102,514	2%	22,169	$102,303	2%	0%
109	Brooke AMC	Ft. Sam Houston	$134,735	32,025	22,757	$144,209	7%	32,791	$139,198	3%	-3%
125	Madigan AMC	Ft. Lewis	$107,086	26,863	24,177	$130,979	22%	26,132	$126,423	18%	-3%
	ARMY MEDICAL CENTER TOTALS		**$986,389**	**228,315**	**162,292**	**$1,002,044**	**2%**	**224,832**	**$956,456**	**-3%**	**-5%**
1	Fox AH	Redstone Arsenal	$14,338	2,129	3,879	$13,702	-4%	2,057	$14,062	-2%	3%
2	Noble AH	Ft. McClellan	$19,895	3,947	4,808	$19,207	-3%	3,720	$19,331	-3%	1%
3	Lyster AH	Ft. Rucker	$21,134	3,769	5,509	$20,239	-4%	3,633	$20,584	-3%	2%
5	Bassett ACH	Ft. Wainwright	$23,278	2,930	5,166	$17,868	-23%	2,866	$18,329	-21%	3%
8	Bliss AH	Ft. Huachuca	$18,407	3,378	4,943	$18,330	0%	3,313	$18,781	2%	2%
23	Hays AH	Ft. Ord	$43,850	9,008	10,957	$41,604	-5%	8,780	$42,142	-4%	1%
32	Evans AH	Ft. Carson	$50,731	9,207	13,155	$46,367	-9%	8,741	$46,546	-8%	0%
48	Martin AH	Ft. Benning	$54,132	12,840	14,513	$56,378	4%	12,427	$56,797	5%	1%
49	Winn AH	Ft. Stewart	$35,398	5,418	8,182	$28,866	-18%	5,296	$29,411	-17%	2%
57	Irwin AH	Ft. Riley	$33,495	6,124	10,635	$35,155	5%	6,092	$36,031	8%	2%
58	Munson AH	Ft. Leavenworth	$16,975	1,931	5,357	$16,235	-4%	1,961	$16,882	-1%	4%
60	Blanchfield ACH	Ft. Campbell	$47,946	9,757	16,357	$53,829	12%	9,731	$55,096	15%	2%
61	Ireland AH	Ft. Knox	$40,712	8,149	12,201	$42,341	4%	7,850	$42,792	5%	1%
64	Bayne-Jones AH	Ft. Polk	$31,239	5,589	8,186	$29,218	-6%	5,610	$30,057	-4%	3%
69	Kimbrough AH	Ft. Meade	$34,348	4,686	11,934	$34,839	1%	4,552	$35,554	4%	2%
70	Cutler AH	Ft. Devens	$16,383	2,312	4,383	$15,071	-8%	2,378	$15,742	-4%	4%
75	Wood AH	Ft. Leonard Wood	$45,369	8,744	12,350	$43,836	-3%	8,380	$44,171	-3%	1%
81	Patterson AH	Ft. Monmouth	$16,564	1,398	4,018	$12,504	-25%	1,392	$12,995	-22%	4%
82	Weleon AH	Ft. Dix	$32,034	4,565	7,191	$25,182	-21%	4,590	$25,959	-19%	3%
86	Keller AH	West Point	$17,827	4,074	4,164	$18,186	2%	4,078	$18,745	5%	3%
89	Womack AH	Ft. Bragg	$58,504	16,361	20,759	$75,866	30%	16,513	$77,829	33%	3%
98	Reynolds AH	Ft. Sill	$39,168	8,109	11,593	$41,054	5%	7,788	$41,426	6%	1%
105	Moncrief AH	Ft. Jackson	$35,327	8,656	9,430	$37,865	7%	9,064	$39,604	12%	5%
110	Darnall AH	Ft. Hood	$63,374	14,646	17,937	$66,812	5%	14,855	$68,708	8%	3%
121	McDonald AH	Ft. Eustis	$21,060	3,488	7,398	$23,422	11%	3,534	$24,237	15%	3%
122	Kenner AH	Ft. Lee	$19,645	4,077	5,002	$19,854	1%	4,129	$20,557	5%	4%

Source: FY90 Medical Expense and Performance Reporting System (MEPRS) expenses reported by the Defense Medical Information System (DMIS). Expenses stated in thousands.

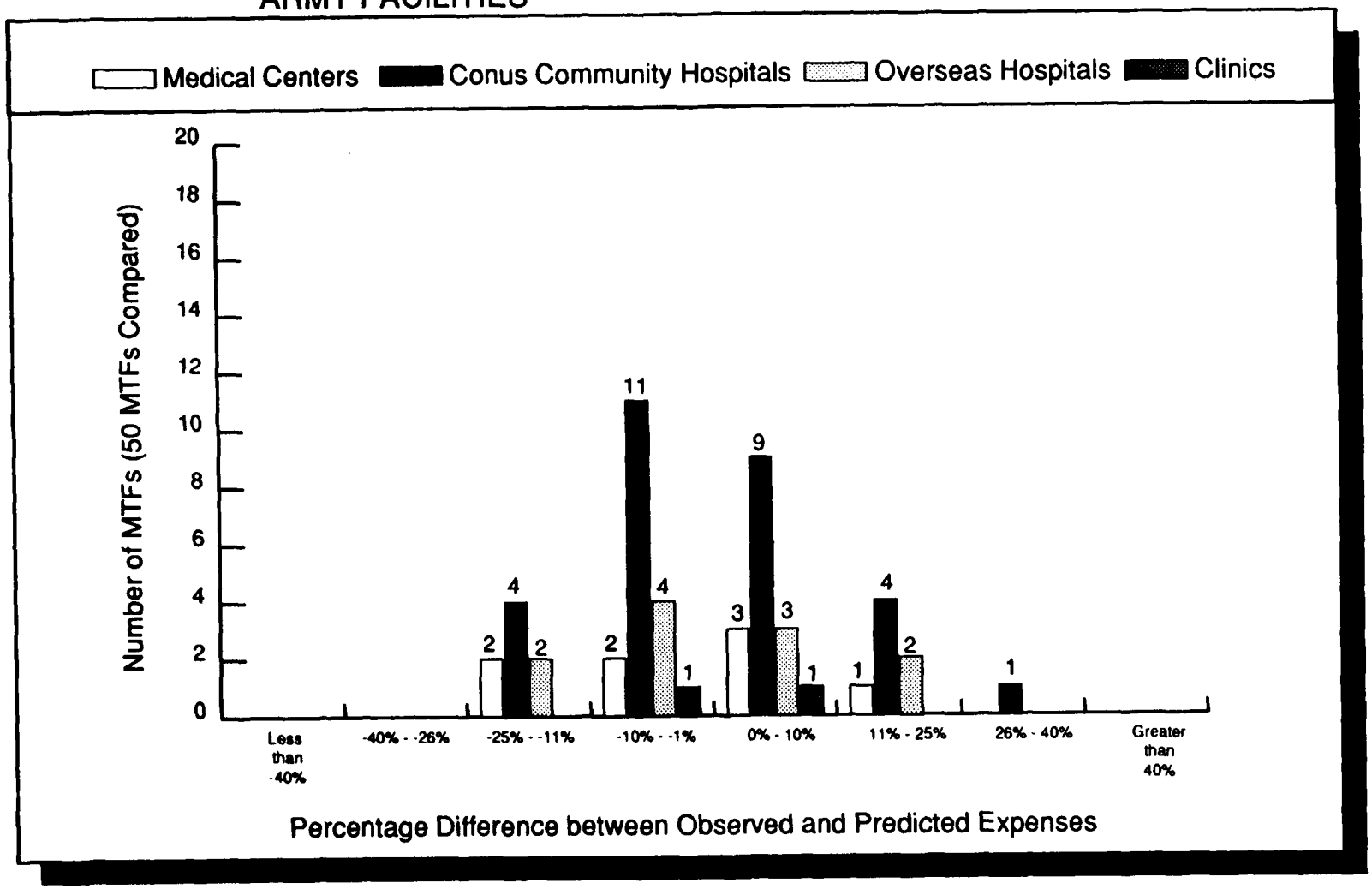
-- Continued --

EXHIBIT 3-15: MODELED AND OBSERVED FY90 ARMY TOTAL EXPENSES (CONCLUDED)

DMIS ID	NAME	INSTALLATION	FY90 OBSERVED EXPENSES	FY90 VERSION 4 IWUs	FY90 AWUs	FY90 EXP PROJ BY FY90 MODEL (INFLATED)	% DIFF	FY90 VERSION 8 IWUs	FY90 EXPENSES PROJ BY FY90 MODEL	% DIFF	% DIFF BETWEEN FY88 & FY90 MODEL PROJECTIONS
123	Dewitt AH	Ft. Belvoir	$34,129	6,270	9,076	$32,356	-5%	6,093	$32,853	-4%	2%
131	Weed ACH	Ft. Irwin	$10,116	1,215	2,599	$9,320	-8%	1,137	$9,583	-5%	3%
294	Hawley AH	Ft. Benjamin Harrison	$8,445	945	2,910	$9,393	11%	915	$9,768	16%	4%
	ARMY CONUS COMM HOSP TOTALS		**$903,823**	**173,724**	**254,591**	**$904,900**	**0%**	**171,472**	**$924,561**	**2%**	**2%**
601	34th General Hospital	Augsburg	$24,210	3,158	5,481	$22,356	-8%	2,969	$22,926	-5%	3%
602	5th General Hospital	Bad Cannstatt	$36,844	5,526	7,970	$33,397	-9%	5,746	$36,120	-2%	8%
604	2nd Field Hospital	Bremerhaven	$14,799	1,579	$2,834	$12,755	-14%	$1,479	$12,644	-15%	-1%
605	97th General Hospital	Frankfurt	$67,853	9,902	15,039	$59,400	-12%	9,985	$64,241	-5%	8%
606	130th Station Hospital	Heidelberg	$33,702	4,294	8,905	$32,711	-3%	4,195	$34,427	2%	5%
607	2nd General Hospital	Landstuhl	$52,356	12,446	12,483	$59,399	13%	12,110	$63,447	21%	7%
608	98th General Hospital	Nuernberg	$44,764	6,766	12,639	$46,811	5%	6,694	$49,948	12%	7%
609	67th Evacuation Hospital	Wurzburg	$28,879	3,443	8,231	$29,243	1%	3,409	$30,768	7%	5%
611	45th Field Hospital	Vicenza	$10,705	890	1,714	$8,642	-19%	885	$8,387	-22%	-3%
612	121st Evacuation Hospital	Seoul	$42,605	6,124	8,912	$36,894	-13%	6,069	$39,246	-8%	6%
613	Gorgas ACH	Gorgas	$30,085	7,003	5,466	$31,081	3%	6,750	$32,577	8%	5%
	ARMY OVERSEAS HOSPITAL TOTALS		**$386,801**	**61,132**	**89,675**	**$372,689**	**-4%**	**60,290**	**$394,729**	**2%**	**6%**
330	Wilcox AH/C Ft. Drum	Ft. Drum	$12,620	---	4,511	$11,159	-12%	---	$12,752	1%	14%
610	USAHC Sagami, Japan	Japan	$3,227	---	844	$3,663	13%	---	$3,127	-3%	-15%
	ARMY CLINIC TOTALS		**$15,847**	**---**	**5,354**	**$14,822**	**-6%**	**---**	**$15,878**	**0%**	**7%**

Source: FY90 Medical Expense and Performance Reporting System (MEPRS) expenses reported by the Defense Medical Information System (DMIS). Expenses stated in thousands.

EXHIBIT 3-16: HISTOGRAM OF PERCENTAGE DIFFERENCES BETWEEN FY90 OBSERVED TOTAL EXPENSES AND FY90 VERSION 8 MODEL PREDICTED EXPENSES: ARMY FACILITIES



expenses and predictions by either the FY88 or FY90 models was Womack AH -- Ft. Bragg (DMIS ID 89), possessing a 33% difference between FY90 model projections and actual expenses, and a 30% difference for FY88 model projections.

The comparisons of FY90 model predictions to FY88 model projections are summarized graphically in exhibit 3-17. The histogram displays the number of facilities having FY90 total expenses projected by the FY90 models differing by a given percentage range from FY90 total expenses projected by the FY88 models. For the Army, 41 out of 50 MTFs (82%) had FY90 model projections varying from FY88 model projections by five percent or less, and 47 (94%) varying by within ten percent. All Army CONUS community hospitals are in the 0% - 5% range. Only the two Army clinics and Walter Reed AMC had projections from the alternative models which differed by more than ten percent from each other. However, although these differences exist, neither model projected expenses which varied significantly from actual FY90 expenses and the models appear quite stable in the aggregate.

Navy

Total Navy FY90 observed and predicted expenses are displayed in exhibit 3-18. As a reminder, the following Navy MTFs were excluded from the FY90 modeling prior to final parameter estimation:

- NH Bethesda (DMIS ID 67) was excluded from medical center inpatient nonclinician expense and inpatient clinician modeling;
- NH Cherry Point (DMIS ID 91) was excluded from CONUS community hospital inpatient clinician salary modeling;
- BRH NAVSTA Adak (DMIS ID 7) and NH Long Beach were excluded from CONUS community hospital ambulatory modeling;
- NH Okinawa (DMIS ID 621) was excluded from overseas hospital inpatient nonclinician and ambulatory expense modeling; and
- NMCL Port Hueneme (DMIS ID 26) and NMCL Pearl Harbor (DMIS ID 280) were excluded from clinic ambulatory modeling.

EXHIBIT 3-17: HISTOGRAM OF PERCENTAGE DIFFERENCES BETWEEN FY90 BUDGETS PREDICTED BY FY88 AND FY90 MODELS: ARMY FACILITIES

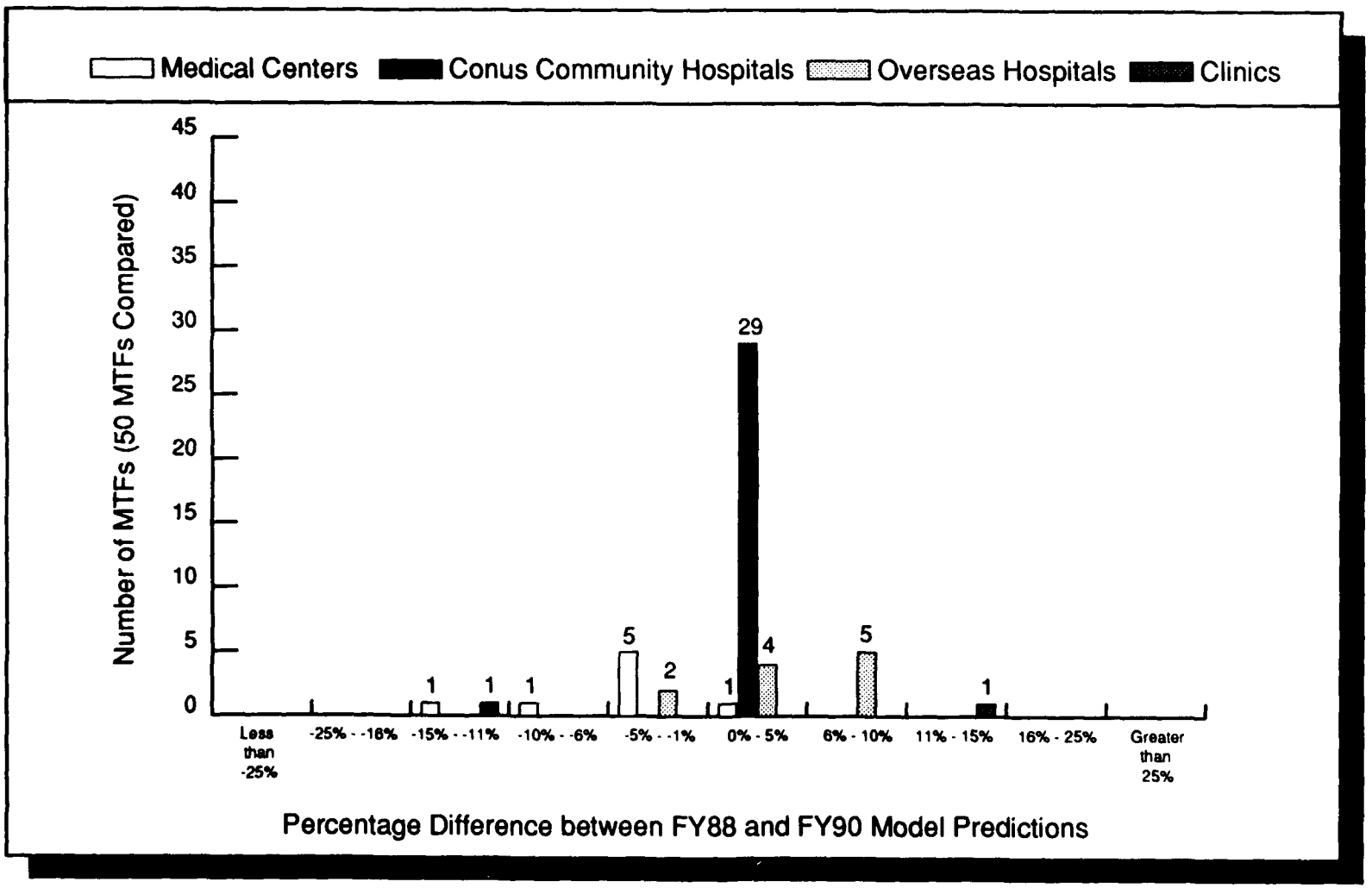


EXHIBIT 3-18: MODELED AND OBSERVED FY90 NAVY TOTAL EXPENSES

DMIS ID	NAME	INSTALLATION	FY90 OBSERVED EXPENSES	FY90 VERSION 4 IWUs	FY90 AWUs	FY90 EXP PROJ BY FY90 MODEL (INFLATED)	% DIFF	FY90 VERSION 8 IWUs	FY90 EXPENSES PROJ BY FY90 MODEL	% DIFF	% DIFF BETWEEN FY88 & FY90 MODEL PROJECTIONS
27	NH Oakland	Oakland	$93,330	13,502	12,189	$81,288	-13%	13,246	$86,475	-7%	6%
29	NH San Diego	San Diego	$176,923	33,589	28,124	$178,747	1%	35,527	$180,150	2%	1%
67	NH Bethesda	Bethesda	$100,776	24,585	15,265	$122,230	21%	25,341	$123,216	22%	1%
124	NH Portsmouth	Portsmouth	$163,641	30,063	27,934	$161,275	-1%	32,457	$165,881	1%	3%
	NAVY MEDICAL CENTER TOTALS		**$534,670**	**101,738**	**83,513**	**$543,541**	**2%**	**106,572**	**$555,721**	**4%**	**2%**
7	BRH NAVSTA Adak	Adak	$3,240	418	1,039	$6,218	92%	392	$6,128	89%	-1%
24	NH Camp Pendleton	Camp Pendleton	$49,637	8,185	9,879	$50,697	2%	8,209	$48,721	-2%	-4%
25	NH Long Beach	Long Beach	$40,419	4,540	5,899	$30,280	-25%	4,752	$29,704	-27%	-2%
28	NH Lemoore	Lemoore	$11,644	1,148	2,928	$13,269	14%	1,042	$12,598	8%	-5%
30	NH Twenty-nine Palms	Twenty-nine Palms	$10,025	1,424	3,424	$15,341	53%	1,388	$14,750	47%	-4%
35	NH Groton	Groton	$22,580	1,753	4,651	$19,539	-13%	1,838	$19,024	-16%	-3%
38	NH Pensacola	Pensacola	$47,091	6,338	10,706	$48,063	2%	6,282	$45,853	-3%	-5%
39	NH Jacksonville	Jacksonville	$65,627	8,974	12,519	$59,938	-9%	10,092	$60,275	-8%	1%
40	NH Orlando	Orlando	$39,267	5,424	9,985	$43,697	11%	6,255	$43,955	12%	1%
56	NH Great Lakes	Great Lakes	$42,696	4,633	11,121	$44,691	5%	5,026	$43,674	2%	-2%
68	NH Patuxent River	Patuxent River	$10,666	761	2,299	$10,540	-1%	719	$10,168	-5%	-4%
91	NH Camp Lejeune	Camp Lejeune	$43,866	7,939	10,136	$50,746	16%	8,309	$49,632	13%	-2%
92	NH Cherry Point	Cherry Point	$16,184	1,737	3,998	$17,724	10%	1,658	$16,903	4%	-5%
99	NH Philadelphia	Philadelphia	$19,550	1,832	4,765	$20,056	3%	2,084	$19,949	2%	-1%
100	NH Newport	Newport	$22,114	2,337	3,507	$17,976	-19%	2,548	$17,950	-19%	0%
103	NH Charleston	Charleston	$46,370	9,176	8,699	$50,112	8%	9,636	$49,399	7%	-1%
104	NH Beaufort	Beaufort	$24,168	2,271	6,801	$26,735	11%	2,193	$25,399	5%	-5%
107	NH Millington	Millington	$27,404	2,504	5,563	$23,993	-12%	2,881	$24,027	-12%	0%
118	NH Corpus Christi	Corpus Christi	$21,741	1,959	3,585	$17,190	-21%	1,884	$16,436	-24%	-4%
126	NH Bremerton	Bremerton	$35,982	4,270	7,250	$33,229	-8%	4,462	$32,385	-10%	-3%
127	NH Oak Harbor	Oak Harbor	$10,679	1,275	3,204	$14,349	34%	1,277	$13,905	30%	-3%
	NAVY CONUS COMM HOSP TOTALS		**$610,949**	**78,898**	**131,958**	**$614,383**	**1%**	**82,926**	**$600,834**	**-2%**	**-2%**
615	NH Guantanamo Bay	Guantanamo Bay	$8,237	943	1,320	$8,963	9%	1,028	$7,525	-9%	-16%
616	NH Roosevelt Roads	Ceiba	$14,870	1,827	2,284	$13,744	-8%	1,927	$12,018	-19%	-13%
617	NH Naples	Naples	$17,263	2,190	3,288	$17,278	0%	2,230	$15,139	-12%	-12%
618	NH Rota	Rota	$13,113	2,518	2,557	$16,243	24%	2,481	$14,026	7%	-14%
619	NH Subic Bay	Subic Bay	$17,590	3,195	4,126	$22,049	25%	3,358	$19,898	13%	-10%
620	NH Guam	Agana	$20,975	3,546	4,132	$22,977	10%	3,684	$20,714	-1%	-10%

Source: FY90 Medical Expense and Performance Reporting System (MEPRS) expenses reported by the Defense Medical Information System (DMIS). Expenses stated in thousands.

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EXHIBIT 3-18: MODELED AND OBSERVED FY90 NAVY TOTAL EXPENSES (CONCLUDED)

DMIS ID	NAME	INSTALLATION	FY90 OBSERVED EXPENSES	FY90 VERSION 4 IWUs	FY90 AWUs	FY90 EXP PROJ BY FY90 MODEL (INFLATED)	% DIFF	FY90 VERSION 8 IWUs	FY90 EXPENSES PROJ BY FY90 MODEL	% DIFF	% DIFF BETWEEN FY88 & FY90 MODEL PROJECTIONS
621	NH Okinawa	Okinawa	$56,009	5,852	5,642	$32,857	-41%	6,146	$30,344	-46%	-8%
622	NH Yokosuka	Yokosuka	$24,339	3,428	5,263	$25,587	5%	3,576	$23,124	-5%	-10%
623	NH Keflavik	Iceland	$2,216	466	827	$6,453	191%	503	$5,066	129%	-21%
NAVY OVERSEAS HOSPITAL TOTALS			**$174,612**	**23,966**	**29,440**	**$166,151**	**-5%**	**24,933**	**$147,852**	**-15%**	**-11%**
26	NMCL Port Hueneme	Port Hueneme	$1,837	—	2,004	$6,255	240%	—	$6,395	248%	2%
41	NMCL Key West	Key West	$3,297	—	834	$3,776	15%	—	$3,213	-3%	-15%
280	NMCL Pearl Harbor	Pearl Harbor	$27,625	—	6,232	$15,214	-45%	—	$17,892	-35%	18%
297	NMCL New Orleans	New Orleans	$4,047	—	966	$4,057	0%	—	$3,573	-12%	-12%
306	NMCL Annapolis	Annapolis	$8,621	—	2,422	$7,141	-17%	—	$7,531	-13%	5%
321	NMCL Portsmouth	Portsmouth	$3,579	—	1,324	$4,814	35%	—	$4,545	27%	-6%
385	NMCL Quantico	Quantico	$10,277	—	2,767	$7,873	-23%	—	$8,471	-18%	8%
396	NMCL Seattle	Seattle	$1,853	—	682	$3,454	86%	—	$2,800	51%	-19%
8931	NMCL London	London	$2,646	—	1,006	$4,140	56%	—	$3,681	39%	-11%
NAVY CLINIC TOTALS			**$63,783**	**—**	**18,238**	**$56,723**	**-11%**	**—**	**$58,101**	**-9%**	**2%**

Source: FY90 Medical Expense and Performance Reporting System (MEPRS) expenses reported by the Defense Medical Information System (DMIS). Expenses stated in thousands.

The comparisons of FY90 model projections to FY90 observed expenses (including clinics) are summarized graphically in exhibit 3-19. The histogram displays the number of facilities having FY90 total expenses projected by the FY90 models differing from FY90 total actual expenses by a given percentage range. The exhibit reveals that 19 of 43 Navy MTFs (44%) had differences between projected and actual expenses within ten percent. Only one out of nine Navy clinics was in this range. Ignoring clinics, the percentage of Navy MTFs with a ten percent or less difference between projected and actual expenses rises to 53% (18 out of 34 MTFs). As these statistics demonstrate, Navy clinics did not lend themselves to modeling as well as other Navy facilities or clinics of the other Services.

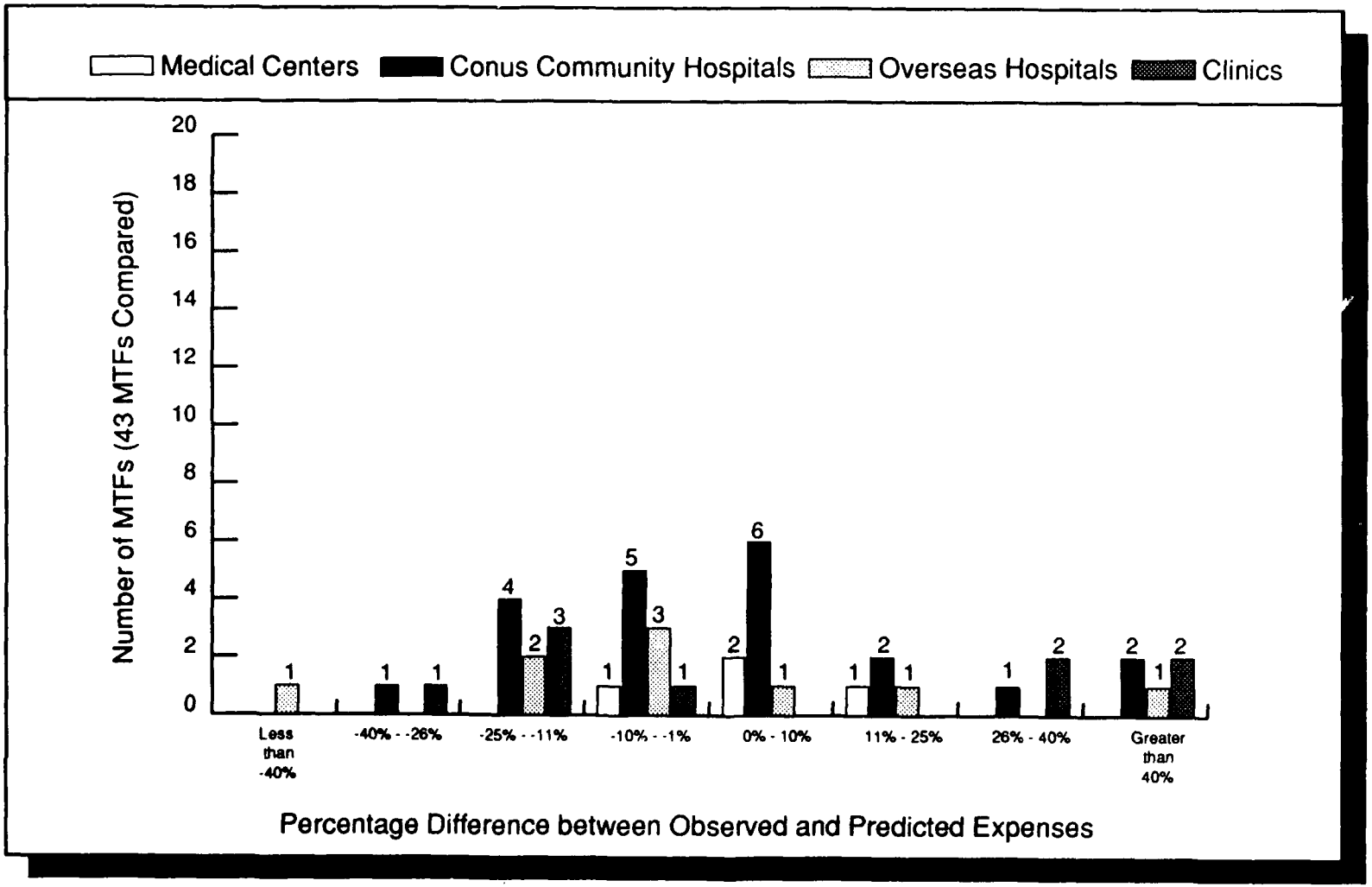
The exhibit further reveals that the FY90 model predictions for 11 Navy MTFs were more than 25% different from FY90 actual total expenses. Ten of these 11 also had significant differences between FY88 model projections and FY90 total expenses. These MTFs are displayed in the following table:

Navy MTFs with FY88 and FY90 Model Predictions Different from FY90 Expenses by More than 25%

DMIS ID	Facility
7	BRH NAVSTA Adak
26	NMCL Port Hueneme
30	NH Twenty-nine Palms
127	NH Oak Harbor
280	NMCL Pearl Harbor
321	NMCL Portsmouth
396	NMCL Seattle
621	NH Okinawa
623	NH Keflavik
8931	NMCL London

The FY88 model projected expenses for the eleventh facility, NH Long Beach (DMIS ID 25), differed from FY90 observed expenses by 25%. The Navy models, while producing less accurate results than the Army models,

EXHIBIT 3-19: HISTOGRAM OF PERCENTAGE DIFFERENCES BETWEEN FY90 OBSERVED TOTAL EXPENSES AND FY90 VERSION 8 MODEL PREDICTED EXPENSES: NAVY FACILITIES



proportion of facilities with significant differences between model projections and observed expenses, are nonetheless stable, in terms of consistently identifying these facilities with significant differences.

The comparisons of FY90 model predictions to FY88 model projections are summarized graphically in exhibit 3-20. The histogram displays the number of facilities having FY90 total expenses projected by the FY90 models differing from FY90 total expenses projected by the FY88 models by a given percentage range. The histogram reveals that 26 out of 43 Navy MTFs (60%) had FY90 model projections differing from FY88 model projections by within five percent, while 33 (77%) differed by ten percent or less. Of the remaining ten facilities, all are either overseas hospitals or clinics, suggesting that these facilities produce somewhat less stable models than the CONUS community hospitals or medical centers. Note, however, that while there are facilities for which the FY88 and FY90 model predictions are different by more than ten percent, there are no MTFs that were predicted well by one model and poorly by the other.

Air Force

Total Air Force FY90 observed and predicted expenses are displayed in exhibit 3-21. No Air Force facilities were excluded from the final FY90 parameter estimation. The comparisons of FY90 model projections to FY90 observed expenses (including clinics) are summarized graphically in exhibit 3-22. The histogram displays the number of facilities having FY90 total expenses projected by the FY90 models differing from FY90 total actual expenses by a given percentage range. The histogram demonstrates that 66 out of 119 Air Force facilities (55%) had projected budgets within ten percent of observed FY90 expenses.

EXHIBIT 3-20: HISTOGRAM OF PERCENTAGE DIFFERENCES BETWEEN FY90 BUDGETS PREDICTED BY FY88 AND FY90 MODELS: NAVY FACILITIES

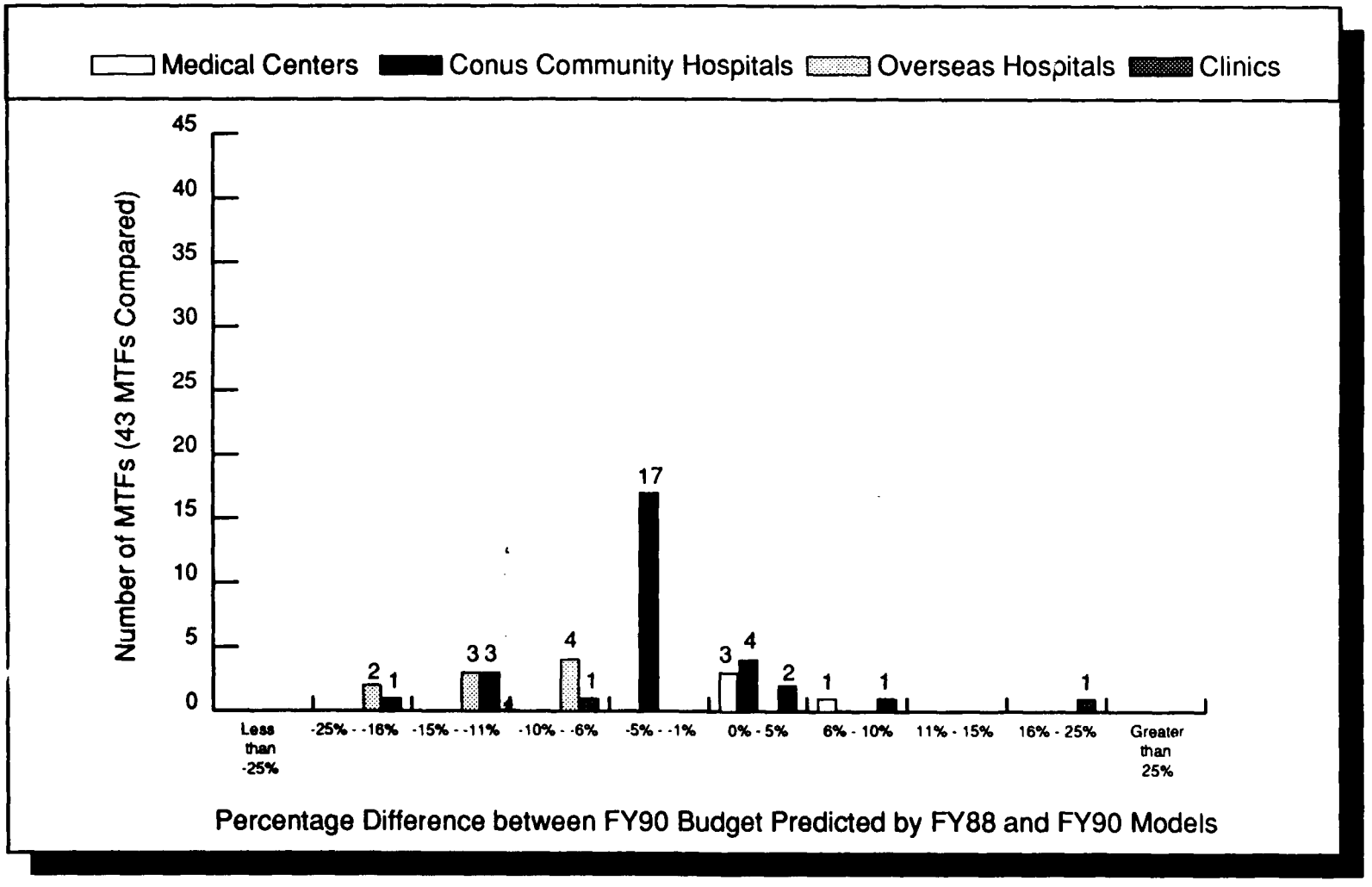


EXHIBIT 3-21: MODELED AND OBSERVED FY90 AIR FORCE TOTAL EXPENSES

DMIS ID	NAME	INSTALLATION	FY90 OBSERVED EXPENSES	FY90 VERSION 4 IWUs	FY90 AWUs	FY90 EXP PROJ BY FY90 MODEL (INFLATED)	% DIFF	FY90 VERSION 8 IWUs	FY90 EXPENSES PROJ BY FY90 MODEL	% DIFF	% DIFF BETWEEN FY88 & FY90 MODEL PROJECTIONS
14	D Grant USAF Med Ctr	Travis AFB	$75,359	15,218	9,489	$68,163	-10%	15,252	$73,547	-2%	8%
55	USAF Med Ctr Scott	Scott AFB	$42,462	8,279	8,094	$42,961	1%	7,967	$51,781	22%	21%
66	M Grow USAF Med Ctr	Andrews AFB	$67,211	11,737	11,602	$57,926	-14%	11,061	$65,101	-3%	12%
73	USAF Med Ctr Keesler	Keesler AFB	$79,867	17,717	10,879	$75,979	-5%	17,404	$79,232	-1%	4%
95	USAF Med Ctr W-P	Wright-Patterson AFB	$80,760	13,824	11,414	$67,667	-16%	13,659	$74,731	-7%	10%
117	Wilford Hall USAF Med Ctr	Lackland AFB	$181,700	44,277	27,167	$189,178	4%	44,980	$180,807	0%	-4%
	AIR FORCE MEDICAL CENTER TOTALS		**$527,360**	**111,053**	**78,645**	**$501,873**	**-5%**	**110,323**	**$525,198**	**0%**	**5%**
4	Air University Rgn Hosp	Maxwell AFB	$13,442	3,682	5,639	$21,787	62%	3,570	$21,689	61%	0%
6	USAF Hospital Elmendorf	Elmendorf AFB	$31,168	4,830	6,497	$26,029	-16%	4,784	$26,129	-16%	0%
9	832nd Medical Group	Luke AFB	$21,477	3,127	6,199	$21,879	2%	3,106	$21,860	2%	0%
10	836th Medical Group	Davis Monthan AFB	$22,638	2,722	5,657	$19,858	-12%	2,625	$19,674	-13%	-1%
11	USAF Hospital Williams	Williams AFB	$11,452	908	2,778	$9,808	-14%	858	$9,781	-15%	0%
12	97th Strategic Hospital	Eaker AFB	$8,950	750	2,267	$8,361	-7%	743	$8,456	-6%	1%
13	USAF Hospital Little Rock	Little Rock AFB	$14,369	1,707	4,188	$14,546	1%	1,691	$14,556	1%	0%
15	9th Strategic Hospital	Beale AFB	$9,958	1,269	2,240	$9,367	-6%	1,237	$9,472	-5%	1%
16	USAF Hospital Mather	Mather AFB	$19,337	2,923	4,186	$17,035	-12%	2,650	$16,633	-14%	-2%
17	93rd Strategic Hospital	Castle AFB	$9,674	1,388	3,608	$12,619	30%	1,346	$12,588	30%	0%
18	1st Strategic Hospital	Vandenberg AFB	$13,428	1,583	3,356	$12,462	-7%	1,604	$12,617	-6%	1%
19	USAF Hospital Edwards	Edwards AFB	$10,449	1,275	3,207	$11,504	10%	1,200	$11,427	9%	-1%
20	831st Medical Group	George AFB	$10,641	1,460	2,960	$11,341	7%	1,505	$11,568	9%	2%
21	22nd Strategic Hospital	March AFB	$25,860	3,476	5,323	$20,670	-20%	3,556	$20,992	-19%	2%
33	USAF Academy Hospital	USAF Academy	$28,279	4,203	6,864	$25,548	-10%	4,184	$25,599	-9%	0%
36	USAF Hospital Dover	Dover AFB	$9,023	1,317	3,257	$11,699	30%	1,338	$11,831	31%	1%
42	USAF Rgn Hospital Eglin	Eglin AFB	$44,304	8,423	10,326	$41,815	-6%	8,565	$42,390	-4%	1%
43	325th Medical Group	Tyndall AFB	$17,459	2,081	3,691	$14,221	-19%	1,930	$14,028	-20%	-1%
44	31st Medical Group	Homestead AFB	$19,118	2,312	5,002	$17,576	-8%	2,191	$17,354	-9%	-1%
45	56th Medical Group	Macdill AFB	$29,066	4,097	7,385	$26,476	-9%	3,953	$26,194	-10%	-1%
46	USAF Hospital Patrick	Patrick AFB	$11,513	874	3,334	$10,960	-5%	848	$10,929	-5%	0%
50	347th Medical Group	Moody AFB	$11,752	1,227	2,842	$10,604	-10%	1,177	$10,609	-10%	0%
51	USAF Hospital Robins	Robins AFB	$11,281	1,355	3,094	$11,419	1%	1,265	$11,330	0%	-1%
53	366th Medical Group	Mountain Home AFB	$10,745	1,478	3,028	$11,527	7%	1,489	$11,676	9%	1%
54	USAF Hospital Chanute	Chanute AFB	$9,861	1,079	3,121	$10,913	11%	1,094	$11,016	12%	1%
59	384th Strategic Hospital	McConnell AFB	$7,890	458	2,088	$7,368	-7%	454	$7,453	-6%	1%
62	2nd Strategic Hospital	Barksdale AFB	$16,904	2,971	5,198	$19,359	15%	2,842	$19,180	13%	-1%
63	23rd Medical Group	England AFB	$10,213	938	2,374	$8,981	-12%	888	$8,997	-12%	0%
65	42nd Strategic Hospital	Loring AFB	$7,139	1,073	1,827	$8,056	13%	1,065	$8,273	16%	3%
71	379th Strategic Hospital	Wurtsmith AFB	$8,505	1,266	2,313	$9,520	12%	1,251	$9,656	14%	1%

Source: FY90 Medical Expense and Performance Reporting System (MEPRS) expenses reported by the Defense Medical Information System (DMIS). Expenses stated in thousands.

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EXHIBIT 3-21: MODELED AND OBSERVED FY90 AIR FORCE TOTAL EXPENSES (CONTINUED)

DMIS ID	NAME	INSTALLATION	FY90 OBSERVED EXPENSES	FY90 VERSION 4 IWUs	FY90 AWUs	FY90 EXP PROJ BY FY90 MODEL (INFLATED)	% DIFF	FY90 VERSION 8 IWUs	FY90 EXPENSES PROJ BY FY90 MODEL	% DIFF	% DIFF BETWEEN FY88 & FY90 MODEL PROJECTIONS
72	410th Strategic Hospital	K.I.Sawyer AFB	$8,965	968	2,312	$8,906	-1%	940	$8,978	0%	1%
74	USAF Hospital Columbus	Columbus AFB	$6,591	644	1,500	$6,458	-2%	623	$6,583	0%	2%
76	351st Strategic Hospital	Whiteman AFB	$9,147	1,406	2,469	$10,152	11%	1,401	$10,310	13%	2%
78	Ehrling Berquist Rgn Hosp	Offutt AFB	$25,164	4,568	7,270	$27,188	8%	4,573	$27,296	8%	0%
79	554th Medical Group	Nellis AFB	$20,479	2,511	6,209	$20,637	1%	2,476	$20,513	0%	-1%
80	509th Strategic Hospital	Pease AFB	$12,692	1,652	2,766	$11,309	-11%	1,629	$11,431	-10%	1%
83	USAF Hospital Kirtland	Kirtland AFB	$16,014	2,613	4,679	$17,486	9%	2,685	$17,747	11%	1%
84	833rd Medical Group	Holloman AFB	$10,994	1,255	3,329	$11,732	7%	1,157	$11,591	5%	-1%
85	27th Medical Group	Cannon AFB	$10,816	1,420	2,742	$10,780	0%	1,442	$10,975	1%	2%
87	380th Strategic Hospital	Plattsburgh AFB	$7,030	472	2,226	$7,701	10%	493	$7,828	11%	2%
88	416th Strategic Hospital	Griffiss AFB	$10,478	1,072	2,865	$10,335	-1%	1,036	$10,350	-1%	0%
90	4th Medical Group	S Johnson AFB	$11,409	1,111	3,578	$11,984	5%	1,058	$11,899	4%	-1%
93	842nd Strategic Hospital	Grand Forks AFB	$9,024	1,465	2,635	$10,637	18%	1,478	$10,827	20%	2%
94	857th Strategic Hospital	Minot AFB	$12,775	2,219	3,114	$13,237	4%	2,122	$13,233	4%	0%
96	USAF Hospital Tinker	Tinker AFB	$12,284	2,485	4,987	$17,898	46%	2,486	$17,963	46%	0%
97	USAF Hospital Altus	Altus AFB	$8,966	1,073	1,867	$8,144	-9%	1,038	$8,254	-8%	1%
101	363rd Medical Group	Shaw AFB	$14,164	1,688	3,715	$13,468	-5%	1,596	$13,355	-6%	-1%
102	354th Medical Group	Myrtle Beach AFB	$8,657	558	2,589	$8,676	0%	544	$8,703	1%	0%
106	44th Strategic Hospital	Ellsworth AFB	$11,811	2,138	3,826	$14,635	24%	2,137	$14,762	25%	1%
111	USAF Hospital Reese	Reese AFB	$7,238	296	1,735	$6,262	-13%	305	$6,388	-12%	2%
112	96th Strategic Hospital	Dyess AFB	$12,272	1,806	3,305	$12,808	4%	1,689	$12,693	3%	-1%
113	USAF Rgn Hosp Sheppard	Sheppard AFB	$27,503	4,932	5,713	$24,513	-11%	5,166	$25,307	-8%	3%
114	USAF Hospital Laughlin	Laughlin AFB	$6,896	526	1,396	$5,986	-13%	521	$6,141	-11%	3%
115	67th Medical Group	Bergstrom AFB	$14,213	1,451	4,042	$13,699	-4%	1,445	$13,716	-3%	0%
116	R Thompson Strat Hosp	Carswell AFB	$38,128	7,398	7,611	$33,745	-11%	7,155	$33,617	-12%	0%
119	USAF Hospital Hill	Hill AFB	$12,405	1,933	3,897	$14,371	16%	1,905	$14,410	16%	0%
120	1st Medical Group	Langley AFB	$25,760	2,799	7,937	$25,026	-3%	2,669	$24,571	-5%	-2%
128	92nd Strategic Hospital	Fairchild AFB	$16,086	3,037	4,246	$17,401	8%	2,913	$17,330	8%	0%
129	90th Strategic Hospital	F.E. Warren AFB	$8,424	1,542	2,613	$10,747	28%	1,492	$10,811	28%	1%
	AIR FORCE CONUS COMM HOSP TOTALS		**$872,279**	**123,289**	**231,019**	**$869,229**	**0%**	**121,200**	**$871,543**	**0%**	**0%**
626	USAF Hospital Bitburg	Bitburg AB	$9,399	1,737	2,634	$10,608	13%	1,713	$10,704	14%	1%
627	USAF Hospital Hahn	Hahn AB	$8,231	1,015	2,552	$8,996	9%	973	$8,931	8%	-1%
629	USAF Hospital Lajes	Lajes Field	$4,822	650	884	$5,197	8%	612	$4,753	-1%	-9%
630	USAF Hospital Torrejon	Torrejon AB	$13,703	1,492	1,982	$8,915	-35%	1,484	$8,880	-35%	0%
631	USAF Hospital Hellenikon	Hellenikon AB	$3,861	251	692	$4,038	5%	325	$3,739	-3%	-7%
632	USAF Hosp Upper Heyford	RAF Upper Heyford	$9,393	2,618	2,626	$12,377	32%	2,698	$12,823	37%	4%
633	USAF Rgn Hosp Lakenheath	RAF Lakenheath	$19,886	4,009	4,158	$18,004	-9%	4,191	$19,180	-4%	7%
634	USAF Hospital Iraklion	Iraklion AS	$2,121	---	425	$2,552	20%	---	$2,050	-3%	-20%

Source: FY90 Medical Expense and Performance Reporting System (MEPRS) expenses reported by the Defense Medical Information System (DMIS). Expenses stated in thousands.

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EXHIBIT 3-21: MODELED AND OBSERVED FY90 AIR FORCE TOTAL EXPENSES (CONTINUED)

DMIS ID	NAME	INSTALLATION	FY90 OBSERVED EXPENSES	FY90 VERSION 4 IWUs	FY90 AWUs	FY90 EXP PROJ BY FY90 MODEL (INFLATED)	% DIFF	FY90 VERSION 8 IWUs	FY90 EXPENSES PROJ BY FY90 MODEL	% DIFF	% DIFF BETWEEN FY88 & FY90 MODEL PROJECTIONS
635	USAF Hospital Incirlik	Incirlik AB	$4,902	1,029	1,273	$6,678	36%	1,011	$6,411	31%	-4%
636	13th Medical Center	Clark AB	$33,863	8,050	7,118	$31,614	-7%	7,975	$33,412	-1%	6%
637	8th Medical Group	Kunsan AB	$2,948	276	663	$4,035	37%	293	$3,612	23%	-10%
638	51st Medical Group	Osan AB	$8,015	821	1,790	$7,205	-10%	791	$6,983	-13%	-3%
639	432nd Medical Group	Misawa	$8,131	1,246	2,541	$9,443	16%	1,332	$9,687	19%	3%
640	475th Medical Group	Yokota AB	$12,838	1,711	2,646	$10,579	-18%	1,738	$10,781	-16%	2%
	AIR FORCE OVERSEAS HOSP TOTALS		**$142,113**	**24,905**	**31,985**	**$140,240**	**-1%**	**25,137**	**$141,948**	**0%**	**1%**
77	341st Strategic Clinic	Malmstrom AFB	$6,421	—	2,327	$4,771	-26%	—	$5,609	-13%	18%
203	USAF Clinic Eielson	Eielson AFB	$4,230	—	1,645	$3,778	-11%	—	$4,180	-1%	11%
248	USAF Clinic Los Angeles	Los Angeles AFS	$3,148	—	762	$2,491	-21%	—	$2,327	-26%	-7%
249	USAF Clinic Norton	Norton AFB	$6,626	—	2,137	$4,494	-32%	—	$5,210	-21%	16%
250	USAF Clinic McClellan	McClellan AFB	$5,561	—	2,487	$5,005	-10%	—	$5,946	7%	19%
251	USAF Clinic Lowry	Lowry AFB	$2,718	—	932	$2,740	1%	—	$2,685	-1%	-2%
252	USAF Clinic Peterson	Peterson AFB	$6,426	—	2,643	$5,231	-19%	—	$6,272	-2%	20%
287	15th Medical Group	Hickam AFB	$5,854	—	2,527	$5,062	-14%	—	$6,029	3%	19%
293	305th Strategic Clinic	Grissom AFB	$4,246	—	1,700	$3,857	-9%	—	$4,294	1%	11%
310	USAF Clinic Hanscom	Hanscom AFB	$3,251	—	1,021	$2,868	-12%	—	$2,870	-12%	0%
326	USAF Clinic McGuire	McGuire AFB	$3,167	—	1,428	$3,461	9%	—	$3,724	18%	8%
335	USAF Clinic Pope	Pope AFB	$3,875	—	1,580	$3,683	-5%	—	$4,042	4%	10%
338	USAF Clinic Vance	Vance AFB	$1,926	—	856	$2,629	36%	—	$2,526	31%	-4%
356	USAF Clinic Charleston	Charleston AFB	$5,044	—	1,798	$4,001	-21%	—	$4,500	-11%	12%
363	USAF Clinic Brooks	Brooks AFB	$2,330	—	794	$2,538	9%	—	$2,394	3%	-6%
364	USAF Clinic Goodfellow	Goodfellow AFB	$3,682	—	1,308	$3,287	-11%	—	$3,474	-6%	6%
365	USAF Clinic Kelly	Kelly AFB	$4,136	—	1,511	$3,582	-13%	—	$3,898	-6%	9%
366	USAF Clinic Randolph	Randolph AFB	$6,161	—	2,605	$5,176	-16%	—	$6,193	1%	20%
395	USAF Clinic McChord	McChord AFB	$3,300	—	1,350	$3,349	1%	—	$3,562	8%	6%
449	24th Medical Group	Howard AFB	$2,463	—	1,000	$2,838	15%	—	$2,826	15%	0%
799	USAF Clinic Geilenkirchen	Geilenkirchen AB	$1,513	—	692	$2,389	58%	—	$2,181	44%	-9%
800	USAF Clinic Rhein Main	Rhein Main AB	$3,765	—	1,704	$3,864	3%	—	$4,304	14%	11%
801	USAF Clinic Sembach	Sembach AB	$3,225	—	1,400	$3,420	6%	—	$3,665	14%	7%
802	43rd Strategic Clinic	Anderson AFB	$3,916	—	1,646	$3,779	-4%	—	$4,181	7%	11%
804	313th Medical Group	Kadena AFB	$7,336	—	3,338	$6,244	-15%	—	$7,730	5%	24%
805	USAF Clinic Spangdahlem	Spangdahlem AB	$3,892	—	1,398	$3,419	-12%	—	$3,662	-6%	7%
806	USAF Clinic Ramstein	Ramstein AB	$7,186	—	3,761	$6,860	-5%	—	$8,617	20%	26%
807	USAF Clinic Zweibrucken	Zweibrucken AB	$3,262	—	1,442	$3,482	7%	—	$3,753	15%	8%
808	USAF Clinic Aviano	Aviano AB	$2,832	—	889	$2,676	-6%	—	$2,594	-8%	-3%
809	USAF Clinic San Vito	San Vito AS	$2,429	—	538	$2,165	-11%	—	$1,858	-24%	-14%
811	USAF Clinic Zaragoza	Zaragoza AB	$1,691	—	407	$1,974	17%	—	$1,583	-6%	-20%

Source: FY90 Medical Expense and Performance Reporting System (MEPRS) expenses reported by the Defense Medical Information System (DMIS). Expenses stated in thousands.

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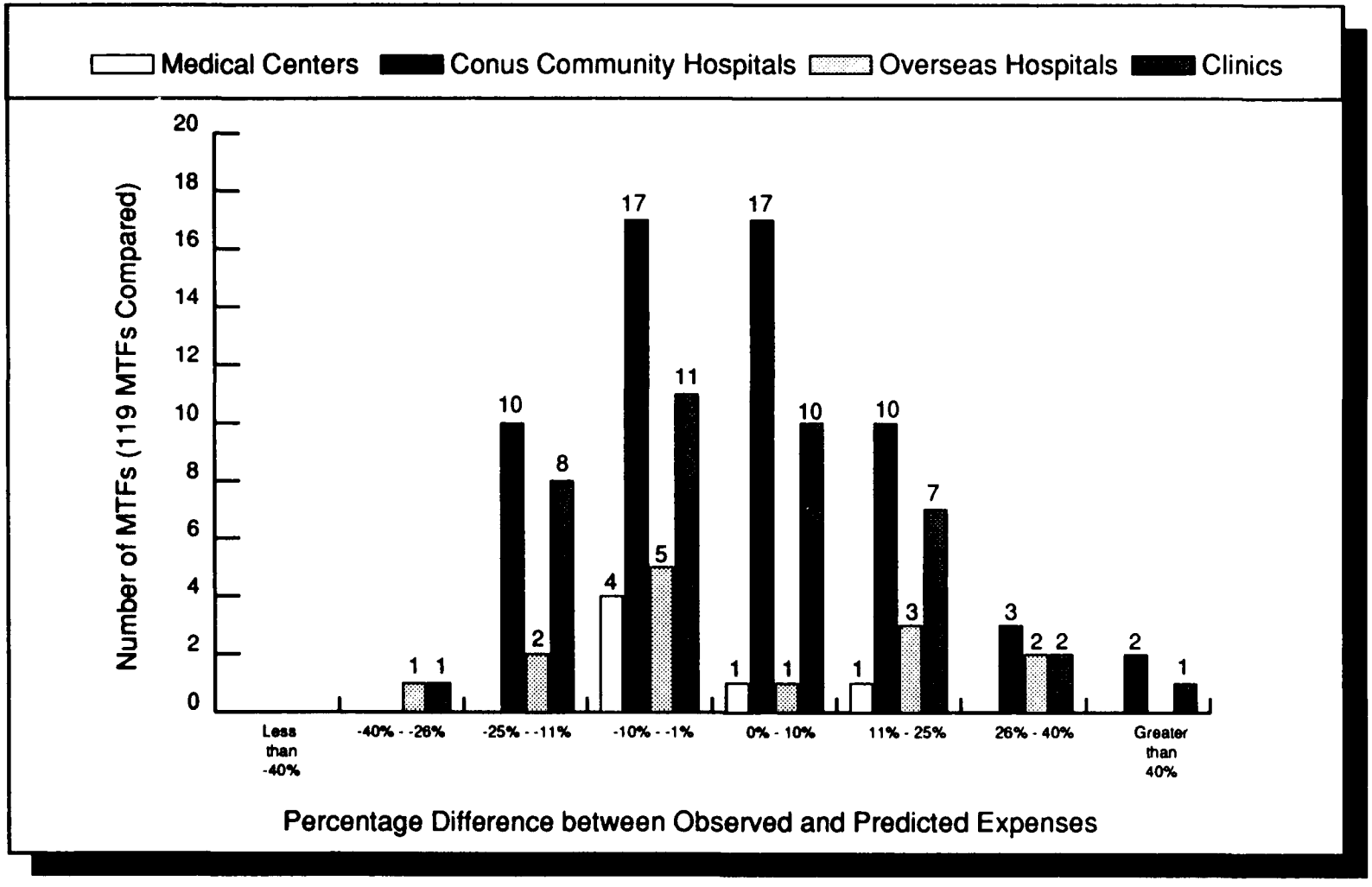
EXHIBIT 3-21: MODELED AND OBSERVED FY90 AIR FORCE TOTAL EXPENSES (CONCLUDED)

DMIS ID	NAME	INSTALLATION	FY90 OBSERVED EXPENSES	FY90 VERSION 4 IWUs	FY90 AWUs	FY90 EXP PROJ BY FY90 MODEL (INFLATED)	% DIFF	FY90 VERSION 8 IWUs	FY90 EXPENSES PROJ BY FY90 MODEL	% DIFF	% DIFF BETWEEN FY88 & FY90 MODEL PROJECTIONS
812	USAF Clinic Bentwaters	RAF Bentwaters	$4,011	—	1,710	$3,872	-3%	—	$4,315	8%	11%
813	USAF Clinic Chicksands	RAF Chicksands	$1,508	—	511	$2,126	41%	—	$1,802	20%	-15%
814	USAF Clinic Alconbury	RAF Upwood	$4,067	—	1,345	$3,341	-18%	—	$3,550	-13%	6%
815	USAF Clinic Fairford	RAF Fairford	$1,369	—	495	$2,102	54%	—	$1,767	29%	-16%
824	USAF Clinic Ankara	Ankara AS	$1,756	—	295	$1,812	3%	—	$1,349	-23%	-26%
825	USAF Clinic Izmir	Izmir	$1,995	—	393	$1,954	-2%	—	$1,553	-22%	-20%
827	USAF Clin Camp N Amsterdam	Soesterberg AB	$1,898	—	548	$2,180	15%	—	$1,879	-1%	-14%
1160	USAF Clinic Comiso	Comiso AS	$1,826	—	500	$2,110	16%	—	$1,779	-3%	-16%
1947	USAF Clin Greenham Common	RAF Greenham Common	$1,986	—	588	$2,238	13%	—	$1,963	-1%	-12%
AIR FORCE CLINIC TOTALS			**$146,030**	**—**	**56,009**	**$136,848**	**-6%**	**—**	**$146,646**	**0%**	**7%**

Source: FY90 Medical Expense and Performance Reporting System (MEPRS) expenses reported by the Defense Medical Information System (DMIS). Expenses stated in thousands.

EXHIBIT 3-22: HISTOGRAM OF PERCENTAGE DIFFERENCES BETWEEN FY90 OBSERVED TOTAL EXPENSES AND FY90 VERSION 8 MODEL PREDICTED EXPENSES: AIR FORCE FACILITIES



The exhibit further reveals that the FY90 model predictions for twelve Air Force MTFs were more than 25% different from FY90 actual total expenses. The FY88 model predictions were more than 25% different than FY90 total actual expenses for fourteen facilities. Eleven Air Force MTFs had both FY88 and FY90 model predictions more than 25% different than total FY90 observed expenses. These MTFs are displayed in the following table:

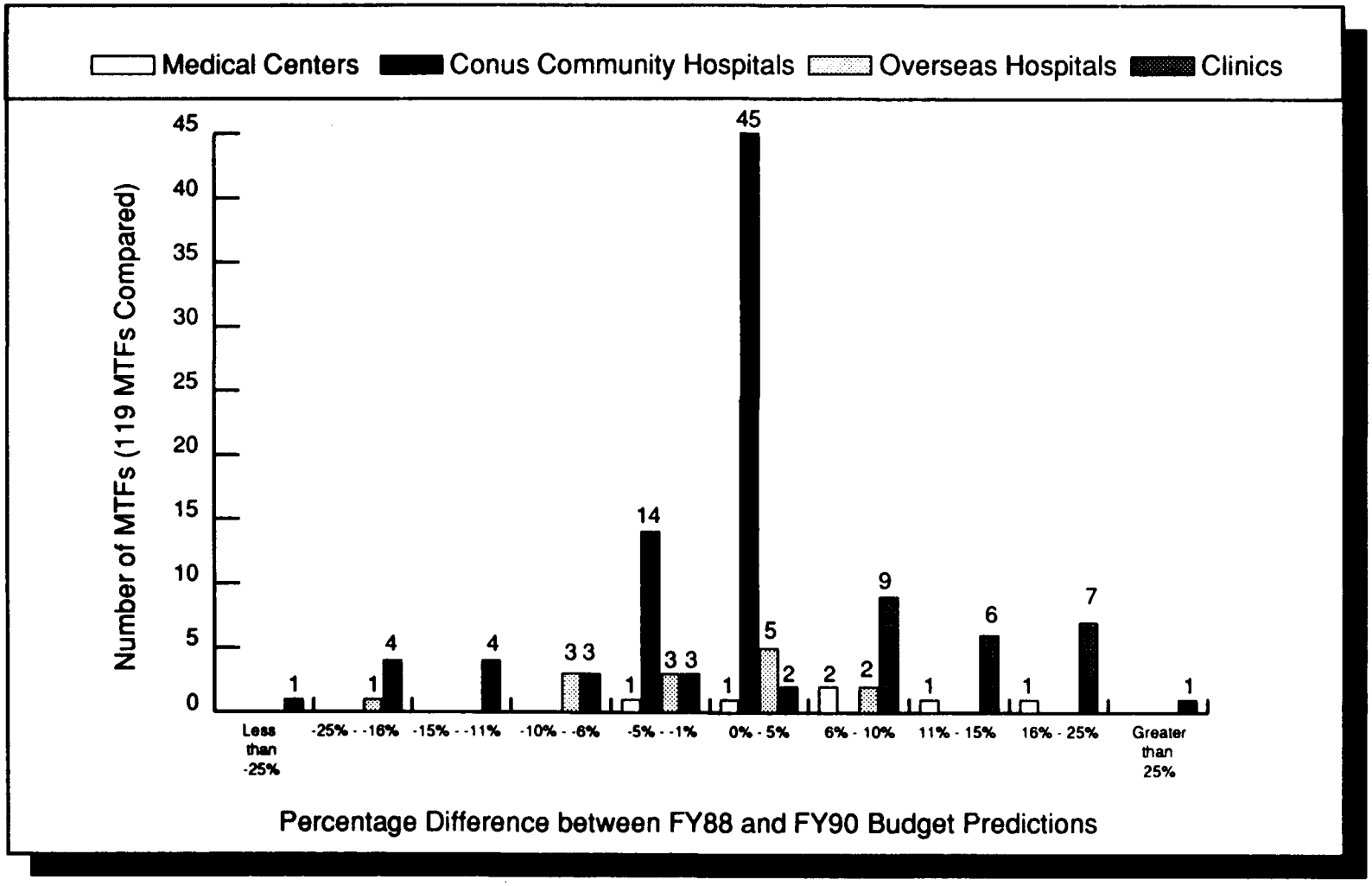
Air Force MTFs with FY88 and FY90 Model Predictions Different from FY90 Expenses by More than 25%

DMIS ID	Facility
4	Air University Rgn Hospital -- Maxwell AFB
17	93rd Strategic Hospital -- Castle AFB
36	USAF Hospital Dover
96	USAF Hospital Tinker
129	90th Strategic Hospital -- F.E. Warren AFB
338	USAF Clinic Vance
630	USAF Hospital Torrejon
632	USAF Hospital Upper Heyford
635	USAF Hospital Incirlik
799	USAF Clinic Geilenkirchen
815	USAF Clinic Fairford

The Air Force models, while having some inaccuracy in projecting total expenses at the MTF level, appear to be very stable in providing consistent projections. This assertion is demonstrated by the fact that models based in different years' data identify similar sets of facilities having predicted total expenses more than 25% different than observed expenses.

Stability of the Air Force models is further corroborated by exhibit 3-23. This histogram presents comparisons of FY90 model projections to FY88 model projections for Air Force facilities. According to the exhibit, 74 of 119 Air Force MTFs (62%) have FY90 model projections within five percent of their FY90 expenses as projected by the FY88 models, and for 93 MTFs (78%) these projections are within ten percent of each other.

EXHIBIT 3-23: HISTOGRAM OF PERCENTAGE DIFFERENCES BETWEEN FY90 BUDGETS PREDICTED BY FY88 AND FY90 MODELS: AIR FORCE FACILITIES



3.5.2 THE EFFECT OF THE PARTNERSHIP PROGRAM

Under the Partnership Program, a MTF may contract with a civilian physician to provide care at the MTF. These relationships have an impact on the level of direct care resources required to provide health care; there would be less MTF resources required to provide care for any given disposition or visit to a Partnership physician at a MTF. If one facility were providing a certain proportion of its care through Partnership, it would have less expenses than a facility providing similar levels of care, all with MTF physicians. Because different facilities have different degrees of Partnership participation, the effect upon parameter estimation is difficult to quantify.

A further complicating factor is the manner in which Partnership data are recorded in the MEPRS data. Partnership workload and expenses are reported in MEPRS at the fourth character Standard Account Code level by the MTF. However, MEPRS data are made available at the third character Standard Account Code level, a lower degree of detail, making it difficult to ascertain the level of workload and expense attributable to Partnership cases. Even if four-character MEPRS data were obtained, they are recorded inconsistently from one MTF to another, making assessment of the exact level of workload and costs attributable to Partnership very difficult.

Because the direct impact of Partnership upon direct care workloads and expenses was not measured, the method for assessing Partnership influence was to examine CHAMPUS data to determine which catchment areas had high levels of Partnership participation. Then the modeling results for these facilities were analyzed in order to evaluate whether

high levels of Partnership participation were correlated with model projections that overestimated actual expenses.

Partnership costs and workload are reported at the catchment area level, which includes all Partnership Program participation for patients residing in an MTF's catchment area independent of the MTF at which the patient obtained services. Thus, the catchment area costs and workload serve only as a surrogate measure of MTF Partnership Program participation. Note, however, that over 80% of FY90 Partnership expenses were for outpatient services and most beneficiaries that receive outpatient care at an MTF will do so within the catchment area where they reside.

Total expense and workload provided under the Partnership Program were obtained for each MTF catchment area from CHAMPUS Health Care Summary data. Two facilities had catchment area total inpatient partnership expenses greater than 10% of facility total inpatient MEPRS expenses:

DMIS ID	Facility	Partnership Share
3	Lyster AH -- Ft. Rucker	17.3%
119	USAF Hospital Hill	11.4%

Eleven facilities had catchment area outpatient partnership expenses greater than ten percent of facility total inpatient MEPRS expenses:

DMIS ID	Facility	Partnership Share
3	Lyster AH -- Ft. Rucker	28.4%
115	67th Medical Group -- Bergstrom AFB	19.5%
16	USAF Hospital Mather	14.2%
4	Air University Rgn Hosp -- Maxwell AFB	13.9%
119	USAF Hospital Hill	12.7%
8	Bliss AH -- Ft. Huachuca	12.5%
110	Darnall AH -- Ft. Hood	12.5%
32	Evans AH -- Ft. Carson	11.7%
21	22nd Strategic Hospital -- March AFB	11.5%
83	USAF Hospital Kirtland	11.0%
36	USAF Hospital Dover	10.5%

PRIMUS/NAVCARE and Occupational Health clinic costs were excluded from MTF ambulatory costs in computing the Partnership share.

As noted above, one should expect facilities with a great deal of Partnership to have estimated expenses greater than observed, as workload is expected to be reported through MEPRS but not all costs. If the partnership arrangement is such that work is done at the MTF, and ancillary expenses are covered through the MTF's budget, clinician salaries may be the only missing component. Additionally, some MTFs may report the clinician FTEs, which would be converted to MEPRS costs, and the impact may be difficult to detect given the estimating error of the models.

The results of comparing projected budgets with actual expenses for the facilities identified above were inconclusive. The inpatient nonclinician expense projections for USAF Hospital Hill were 18% greater than actual expenses, but the projections for Lyster AH -- Ft. Rucker were just 3% greater. The ambulatory expense projections for the Lyster AH -- Ft. Rucker, 67th Medical Group -- Bergstrom AFB, USAF Hospital Mather, Evans AH -- Ft. Carson, 22nd Strategic Hospital -- March AFB, and USAF Hospital Kirtland were all less than observed expenses, with 67th Medical Group -- Bergstrom AFB and USAF Hospital Mather by more than ten percent. Bliss AH -- Ft. Huachuca and Darnall AH -- Ft. Hood had ambulatory expense projections greater than observed expenses, but by less than ten percent. Estimated ambulatory expenses at Air University Regional Hospital -- Maxwell AFB were $5.5. million greater than observed (72% greater), yet total outpatient Partnership expenses within the catchment area were only $571,773. Likewise, at USAF Hospital Dover, estimated ambulatory expenses were roughly $2.2 million higher than actual expenses (37% greater), yet total outpatient Partnership expenses were only $614,567 within the catchment area. Finally,

projected expenses were $1.1 million greater (14%) than observed, while the outpatient Partnership expenses total only $565,664. It is likely that Partnership only accounts for a small portion of the modeling error observed for these facilities.

Overall, it was determined that many facilities are funding a substantial portion of outpatient care through the Partnership Program, but the impact is not causing systematic MEPRS modeling error. The impact may not be detected due to differences in reporting methods or Partnership workload, expenses, and FTEs within MEPRS, or different types of Partnership arrangements, rather than model imprecision. Furthermore, the Partnership Program has been growing rapidly, and may be of concern at some facilities in the future. Overall, however, the current impact does not appear systematic and most likely is small.